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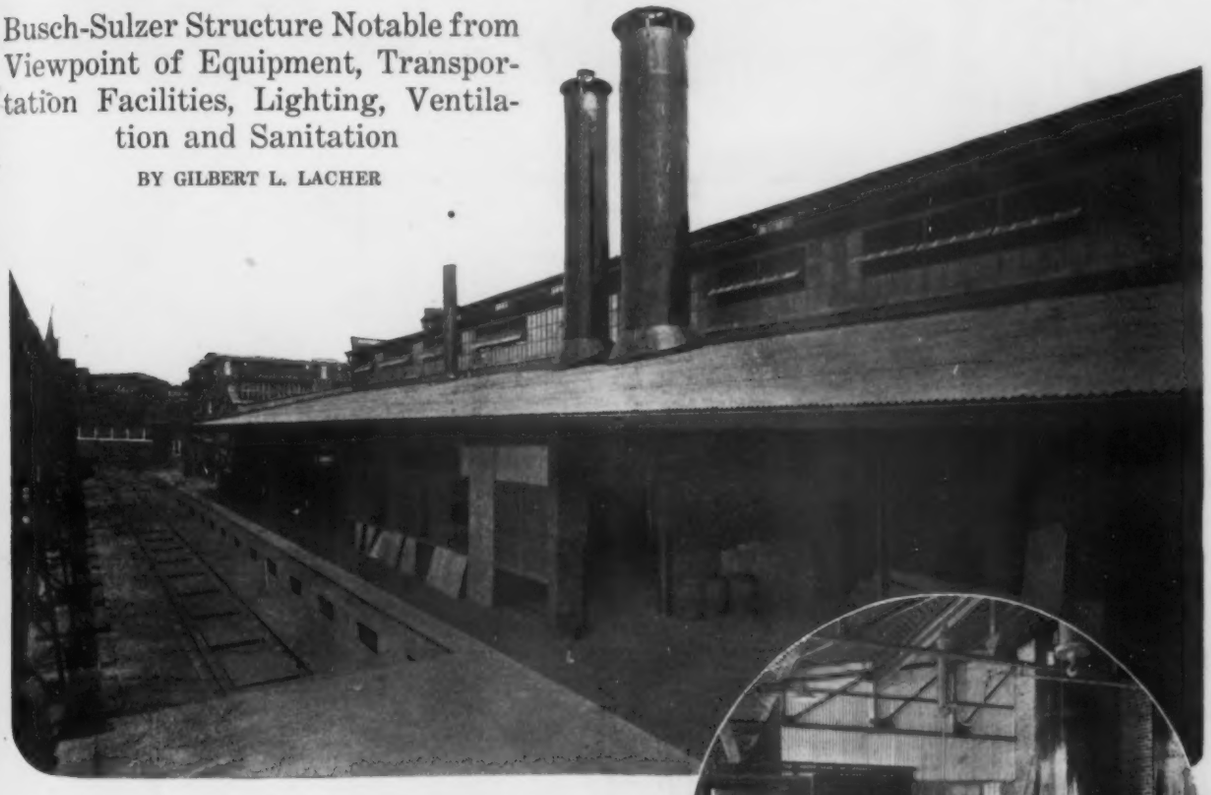
An Achievement in Foundry Design

Busch-Sulzer Structure Notable from Viewpoint of Equipment, Transportation Facilities, Lighting, Ventilation and Sanitation

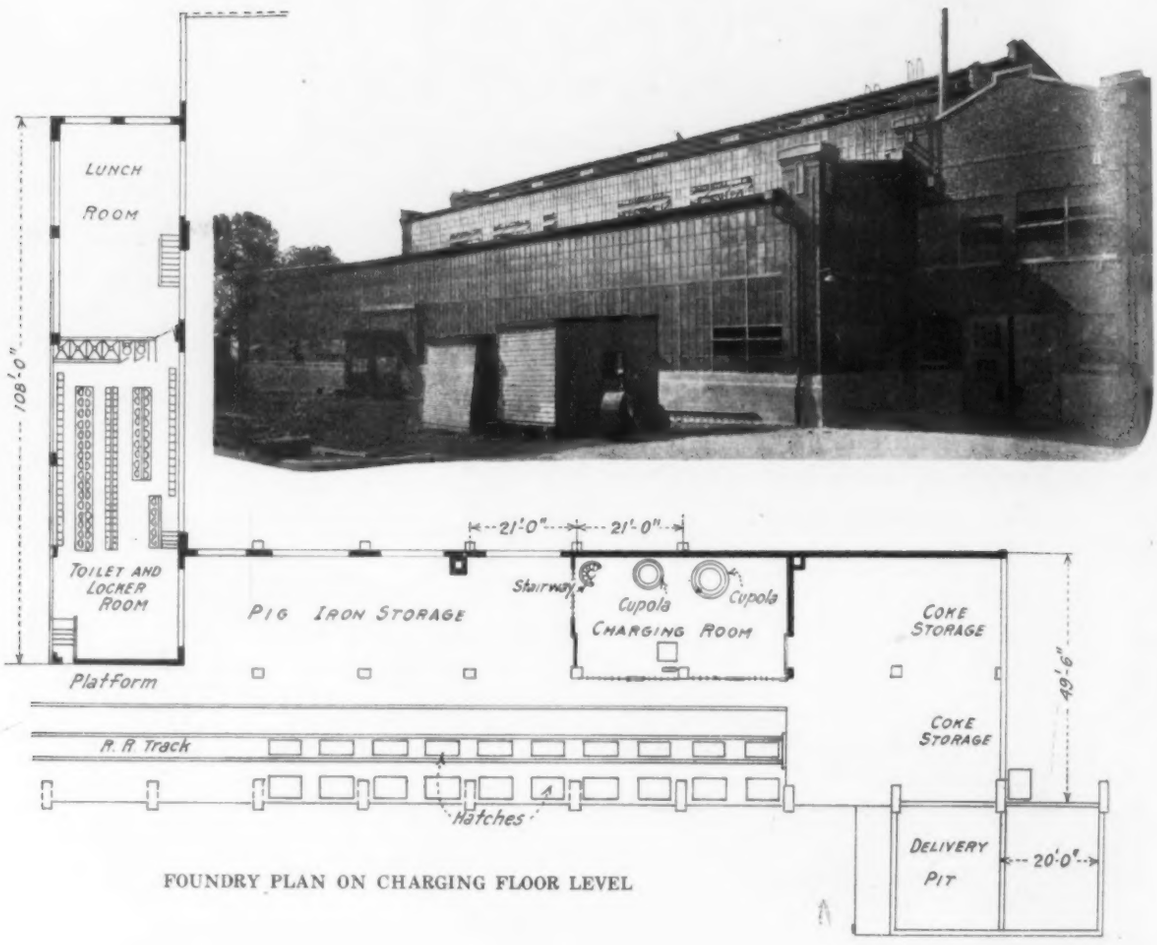
BY GILBERT L. LACHER



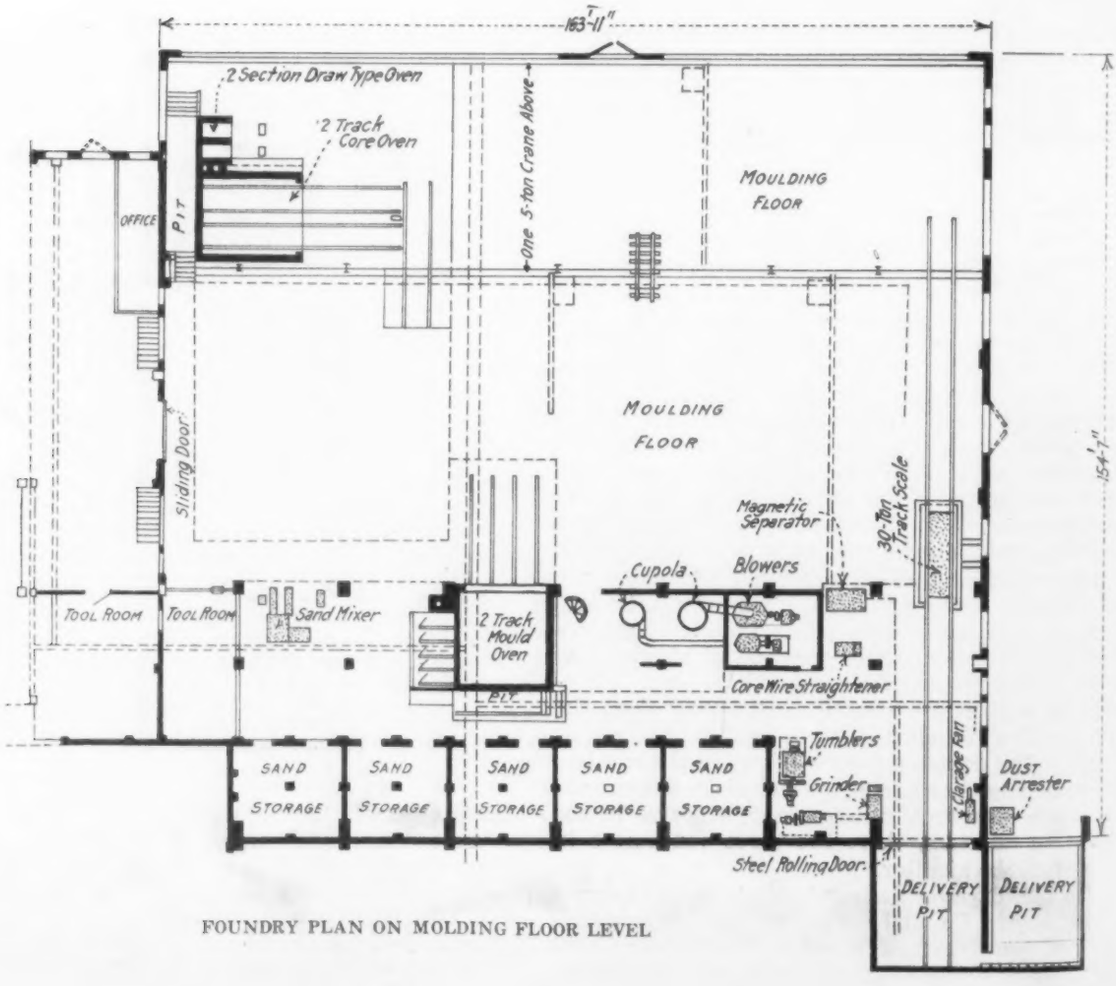
The Railroad Siding Is on a Level with the Charging Floor, Facilitating the Unloading of Pig Iron and Coke by Means of Portable Gravity Conveyors Leading from the Cars to the Concrete Storage Platforms. The trap doors in and beside the track lead to storage bins which open on the foundry floor. Into these sand, clay, firebrick and core oven coke are dropped from the cars, the central hatches being used if the car has a hopper bottom and the side hatches if it is an ordinary gondola. A pneumatic hoist at each cupola is used to haul up the outer end of the charging car in dumping into cupola

SEVERAL years ago the Busch-Sulzer Bros. Diesel Engine Co. built a plant at Second and Utah streets, St. Louis, which was described in detail in THE IRON AGE of Jan. 7, 1915. Although a pattern shop was constructed at that time and a foundry was included in the plans for future extensions, it was not until this year that the latter structure was erected. In appearance the foundry conforms with the architecture of the older buildings, being constructed of red face brick trimmed with stone and having large window areas. The north side of the structure, shown in one of the accompanying illustrations, is a solid wall of glass in metal sash, except for brick trimming and a concrete wind wall rising about five feet above the foundation. Additional light from above is provided by continuous sash above the crane girders of the main aisle and in the central monitor, as shown in the cross section. Artificial light is provided by high power electric lamps hung from the ceiling. The foundry is as well ventilated as lighted. The double tier of windows in the monitor and bordering the roofs of the side aisles is equipped with sash operators, as are many windows in the walls. In addition, there are three ventilators in the roof of the monitor.

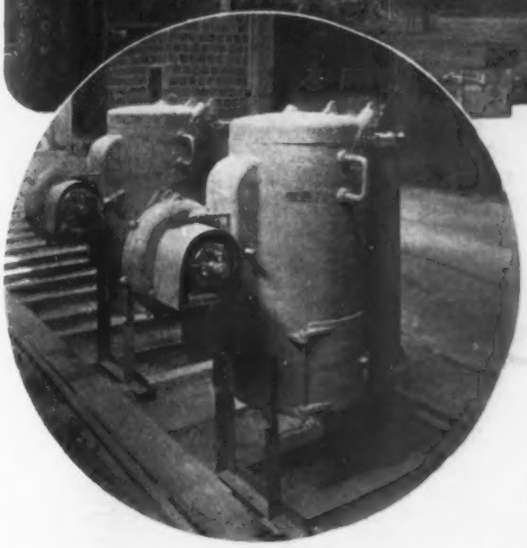
The foundry was designed, erected and equipped by the Austin Co. and ranks high from the standpoint of ventilation, lighting, economical arrangement, material-handling facilities and equipment. Many of the features of the layout were furnished by the owners. It is not a large structure, being approximately 135 ft. by 190 ft. in dimensions. Every effort has been made, however, to make the most economical use of space and to lay out the different departments in such a fashion as to make for a maximum efficiency in operation. Few foun-



FOUNDRY PLAN ON CHARGING FLOOR LEVEL



FOUNDRY PLAN ON MOLDING FLOOR LEVEL



The Smaller Molding Floor, with the Core Department in the Background and Molders' Benches Against the Wall

At the Left Portable Mold Driers Used to Dry Stationary Molds. The driers are heated by a coke fire and are equipped with motor-driven fans which force heated air upon the work to be treated

Below Is the Main Molding Floor with a Maximum Height from Floor to the Ceiling of the Monitor of 52 Ft.

In the Circle Below Is a Close View of the Cupola. The circular stairway leads to the charging room above

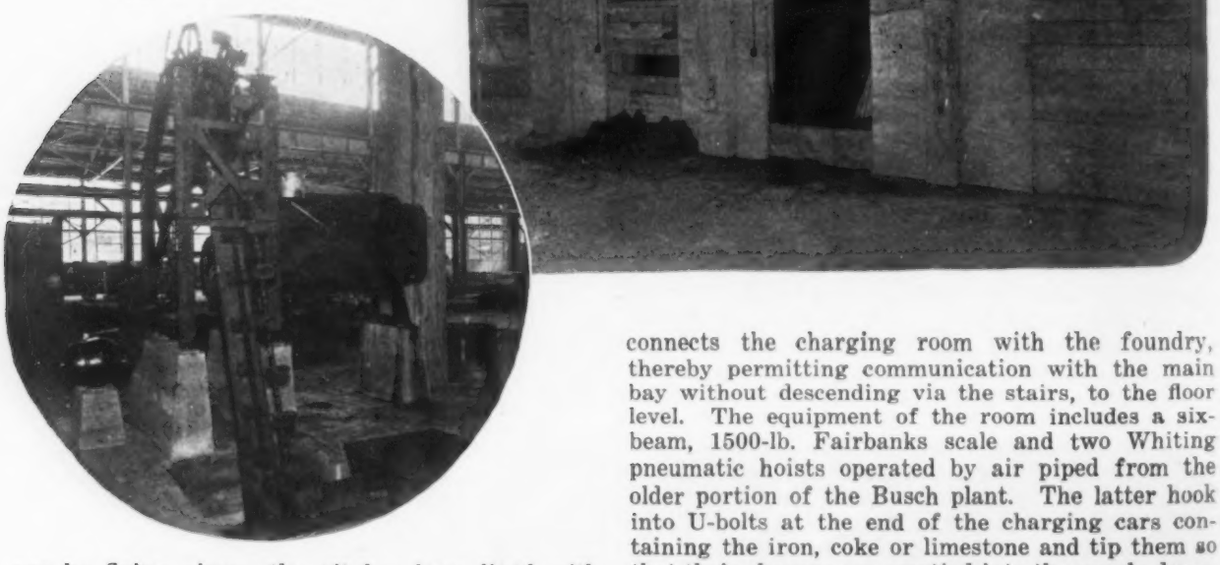
dries have been so well designed from the standpoint of the handling of materials.

A siding from the Manufacturers' Railway borders the south side of the foundry on a level with the charging floor of the cupolas. By means of portable gravity conveyors pig iron, scrap, limestone and coke can be transferred from cars to concrete storage platforms on either side of the charging room. On the other hand, fire brick, clay, core oven coke and sand can be dropped through trap doors in the track, or adjacent to the track—depending upon whether the car to be emptied is of hopper bottom or gondola type—into concrete bins which open on the foundry floor level.

The main aisle of the building is provided with a 25-ton Pawling & Harnischfeger electric crane

with a 5-ton auxiliary and a 15-ton crane of the same make. The north aisle is equipped with a 5-ton P. & H. crane. At the east end of the structure, running through both aisles, is a standard railroad track equipped with two 10-ton Whiting trucks, upon which finished castings are loaded. These trucks are fitted with U-bolts which permit of their being moved by the overhead cranes. From the molding aisles the track leads through the cleaning room to an open delivery pit. In the cleaning room is a 2-ton overhead crane which facilitates the transfer of castings to tumblers.

When work is ready to ship it is weighed in a 30-ton Fairbanks track scale and then moved by truck over the plant track to the delivery pit, which is of reinforced concrete construction and is located in the storage yard of the plant. From here the castings are removed to a covered material yard adjacent to the company's machine shop by a 25-ton Pawling & Harnischfeger electric crane with a 5-ton auxiliary. Any defective castings are removed by the crane from the delivery pit to an adjacent open-air well, also of concrete construction, with the exception that it has a clay floor. Here defective work will be broken by a skull-cracker dropped by the crane. To protect the concrete walls from damage by flying pieces, the pit has been lined with wooden ties to a height of about 6 ft.



The Storage Bins for Core and Molding Sand, Core Oven Coke and Firebrick Are Located Underneath the Railroad Siding. Material is easily accessible from the foundry floor, upon which the bins open. The Motor-Driven Sand-Mixing Machine Shown Below Is Situated Between the Storage Bins and the Main Molding Floor. The sand is deposited in the receptacle shown in the foreground, from which it is carried to the buckets, and thence to the revolving cylinder. The mixed sand is drawn from the cylinder by opening a door on the bottom

Returning to the interior of the foundry, other transportation facilities are to be noted. About midway between the ends of the building is a short narrow-gage track equipped with a 5-ton Whiting truck connecting the main and north aisles. In addition, two standard-gage tracks at the west end of the structure connect the main aisle with the two-car core oven. Two additional standard-gage tracks in central aisle lead into a two-car mold oven on the south side of the building. The distance between the latter set of tracks is the same as the gage of the tracks themselves, thus making it possible to place a car loaded with an unusually large mold on the two inside rails. Both drying ovens are equipped with cables by which cars can be moved in and out by the overhead cranes. The oven tracks are provided with eight 10-ton trucks, two of which are of the rack type.

The only additional transportation feature is a short narrow-gage track equipped with a ladle car and located in front of the cupolas.

The foundry contains two Whiting cupolas located on the south side of the main aisle about midway between the east and west ends. One cupola has a capacity of from 11 to 12 tons an hour and the other 6 to 7 tons an hour. In front of them, extending up to a point just below the tap hole is a brick baffle wall which was installed to protect the workmen from injury in case the bottom of a cupola should accidentally fall. The floor beneath the cupola is of concrete. Consequently the deposits of slag and ashes can be easily removed.

Adjacent to the cupolas is the blower room, in which are located a 24-cu. ft. and a 13-cu. ft. Connersville motor-driven blower connected to an air shaft from the roof.

Just west of the cupolas is a circular stairway leading to the charging room. The latter has a reinforced concrete floor and enjoys ample light from continuous sash facing the open stock yard of the plant. A small opening, with a sliding door, connects the charging room with the foundry, thereby permitting communication with the main bay without descending via the stairs, to the floor level. The equipment of the room includes a six-beam, 1500-lb. Fairbanks scale and two Whiting pneumatic hoists operated by air piped from the older portion of the Busch plant. The latter hook into U-bolts at the end of the charging cars containing the iron, coke or limestone and tip them so that their charges are emptied into the cupola doors.

The cars, eight in number, have a capacity of two tons. Two of the trucks, which have sides except at the charging end, are used for coke and limestone. The material storage platforms on either side of the charging room and connected with it by large doors, are also of reinforced concrete construction and have a maximum capacity of 600 lb. per sq. ft. As the area of the platforms is approximately 4000 sq. ft., they are capable of holding 1200 net tons.

Returning to the floor of the foundry, it will be noted that the furnace doors of the mold oven face the concrete storage bins located under the railroad siding serving the plant. Thus the supplies of coke used in heating the oven are close at hand. Fuel for the core ovens, on the other hand, must be

transported from the bins to the other side of the building.

The main aisle of the foundry is approximately 63 x 164 ft., with a maximum height from floor to the ceiling of the monitor of 52 ft. Except for the projecting rails from the mold and core ovens, which rest in concrete, the floor is clay. This aisle is used for large molding, whereas the north aisle, 41 x 164 ft., is used for making smaller molds and cores. The floor of the latter is also clay, except

Looking Into the Delivery Pit Which Projects Into the Storage Yard. The crane picks up the finished castings. The concrete well just beyond the delivery pit is the breaking pit, which will be used for breaking up defective castings
In the Circle is a View of the Cleaning Room. In the left background is a car on the plant track at the entrance to the open delivery pit

at the west end in the core department, where it is of concrete. On the north wall of this aisle are molders' benches upon which small work can be done. Four similar benches are situated along the wall in the core department, adjacent to which are four core sand bins and a portable Howe scale.

An unusual feature of the two-car core oven is that the tracks extending from the main aisle into the core department are at right angles with the tracks entering the oven. The crane is used at this point to lift cars and transfer them from one track to another. Both the mold oven and the core oven were built after designs of the Whiting Foundry Equipment Co., Harvey, Ill. In addition to these track-type ovens there are two Whiting drawer-type core ovens, containing five drawers each, which are heated by the same furnace which serves the larger core oven.

The foundry aisles are equipped with five ladles ranging from 1 to 10 tons capacity, as well as with a number of hand ladles. In addition, several special devices have been provided to promote efficiency in operation. For instance, there are three portable Hanna mold driers, used to dry stationary molds. These burn coke and are equipped with motor-driven fans which force the heated air on to the work to be treated. The core department is provided with two motor-driven Hanna sand shakers and a small motor-driven Hammer core machine, the latter manufactured by the Brown Specialty Machinery Co., Chicago.

On the south side of the foundry, adjacent to the sand storage bins, is a motor-driven sand-mixing machine made by the Standard Sand & Machine Co., Cleveland. The sand is transferred from the bins to the receiving hopper of the machine from which it is forced by a revolving screw to cups on a chain hoist, which deposit their charges in a revolving cylinder and then return to repeat the operation. After the machine has been stopped the mixed sand can be removed by opening a door in the cylinder.

The Locker and Toilet Room Is Noteworthy from the Viewpoint of Light, Ventilation and Sanitation

In the cleaning room are located two tumblers and a grinder with suction exhaust pipes attached, which carry all dust to a dust arrester outside the building. Here also are a motor-driven wire straightener and a motor-driven magnetic separator for the removal of metal from used molding sand. Briefly, the latter machine consists of a perforated magnetized cylinder which sifts the sand during rotation, at the same time retaining all iron contained therein. At the conclusion of an operation the cylinder is demagnetized and sand and iron can be removed from the machine separately.

Among other features of the foundry may be mentioned a tool room located in the southwest corner, several fire hose attachments situated at convenient points with hose and nozzle ready for use, a sliding fire door at the west end of the building as a protection in case a conflagration should occur in the pattern shop adjacent, a similar door separating the delivery pit from the structure, compressed-air pipes with provision for hose attachment on all of the columns inclosing the main aisle, four water tanks with drinking bubblers and hose attachments, situated at convenient points, and toilet facilities adjacent to the sand mixer.

East of the foundry is a small carpenter shop. Adjoining the west end of the foundry is a smaller structure connecting it with the pattern shop. This connecting link contains a storage chamber and the foundry foreman's office on the first floor, and a locker room and lunch hall on the second floor. Through a window in a door connecting the office with the main bay, one gets a view of a large part of the foundry.

The locker room has a concrete floor and is equipped with 50 lockers, a battery of 24 wash basins with hot and cold running water, two toilets and four showers. The room is about 25 x 64 ft., is well lighted, and contains ample space for material additions to the present equipment. Adjoining the locker room is a lunch room of approximately the same size where the men are permitted to eat their lunches whether they bring them or purchase them from the company. This room also has ample window space as well as artificial lighting fixtures.

The foundry poured its first castings, flasks for its own use, on Sept. 10, when the photographs shown were taken. An unusual feature of the structure just completed is that it is a "turn-key" job, having been designed, erected and completely equipped by the Austin Co. In other words, the foundry was turned over to the Busch-Sulzer company ready for operation.

INDUSTRIAL CONFERENCE

Co-operation With Unions Proposed in the New Jersey Plan

At the Fourth Industrial Relations Conference of the New Jersey State Chamber of Commerce, the afternoon of Sept. 18, in the Robert Treat Hotel, Newark, N. J., a plan introduced in person by Governor William N. Runyon was unanimously adopted, providing a joint industrial council for New Jersey. The conference was attended by more than 300 employers and employees, representing various plants throughout the State, besides Governor Runyon and Arthur A. Quinn, president of the New Jersey State Federation of Labor. While the Governor's proposal for a joint industrial council was expected, Arthur A. Quinn's resolution that the suggestion be submitted to a committee, to which the State Federation of Labor would appoint two members, manufacturers' organizations appoint two and the Chamber of Commerce, representing the public, appoint three, including the chairman, was a surprise.

Article 1 of the tentative plan provides for the creation of a joint industrial council to promote industrial co-operation and stabilize industry. Article 2 provides for 15 members—five representing the business interests, five the workers, and five the public. The method to be pursued in appointing these representatives is here given. Article 3 states the functions of the body, which is to convene monthly, or more often, if necessary, and discuss industrial events, issue recommendations to its constituents, gather information, make investigations and arbitrate industrial controversies. Article 4 deals with the organization of the joint council, dividing it into three separate groups to meet between sessions, independently. It also provides for the appointment by the council of permanent joint executive and arbitration committees and such others as may be deemed necessary. Article 5, devoted to expenses, apportions them equally among the three parties in such manner as the council may direct. Article 6 provides that the plan may be amended only upon a three-fourths vote of the council and shall remain in effect until, upon 30 days' notice, one of the three parties shall withdraw.

The adoption of this plan is the culmination of an investigation by the State of New Jersey Bureau of Research, conducted by Paul Studensky, supervisor of the Investigative Staff on Industrial Relations. In an exhaustive report dealing with shop committees, their objects, functions and relations to unions, and industrial councils with their relations to shop committees and unions, the State Investigative Staff draws the conclusions that—

1. Shop committees operated as a substitute for unionism tend to increase industrial unrest.

2. Shop committees which are planned to be neutral on the union question are beneficial especially in the industries where labor is little or not at all organized, but they are unstable in that they eventually become either anti or pro-union.

3. Shop committees combined with unionism present an effective instrument for the protection of the interests of all parties participating in industrial production as well as the public.

In concluding its report, the Investigative Staff enumerates the following points as of importance for consideration by employers, employees, union and non-union, and union organizations: Institution of shop committees in plants only after study of conditions and without any purpose of breaking up the union movement; installation of expert employment and service departments by employers; determination to use the facilities of shop committee systems and not to hamper their operation or try to wreck them simply because they may not involve recognition of the union; recognition of unions by the employers whenever proofs are submitted to them that a large proportion of their employees are unionized; determination of the labor unions to conduct peacefully their membership campaign and prove their following to the employers by submitting lists and figures of their membership, rather than by forcing recognition by means of strikes; determination of both employers and labor unions to recognize and co-ordinate both shop committees, based on representation of union and non-union workers, and purely union organizations; establishment of democratic industrial councils of a particular industry or of a certain area, involving representation from employers and workers, through their respective organizations or by means of an election from the shops, as well as representation from the public, which is the consumer and arbiter between them; and active participation of public opinion in the deliberations of the industrial councils and shop committees with effective co-operation of the public representatives and officials in carrying into effect their recommendations.

Secretary H. R. Heydon, of the New Jersey State Chamber of Commerce, says that the representatives provided for in the resolution will be appointed as soon as possible.

Foundry Week in Philadelphia

Annual Meeting of American Foundrymen's Association and the Foundry and Machine Tool Exhibition

FOUNDRY week, an annual institution held under the auspices chiefly of the American Foundrymen's Association, is scheduled this year for the week beginning Sept. 29 at Philadelphia. Besides the technical sessions, the attractions include the customary exhibition of foundry machinery, supplies and equipment and of machine tools. As was the case last year in Milwaukee, forenoon technical sessions will be held, leaving the afternoons free for the exhibition. Besides iron foundry, steel foundry and malleable foundry problems, special attention will be given to the questions of industrial relations and to the matter of handling materials. The sessions of the American Foundrymen's Association will be held at the Bellevue-Stratford Hotel and the meetings on non-ferrous topics conducted by the Institute of Metals Division of the American Institute of Mining and Metallurgical Engineers will be held at the Ritz-Carlton Hotel. The exhibition will be housed in the Philadelphia Commercial Museum.

The exhibition bids fair to make another record in the series of remarkable conventions which have marked progress in the foundry and allied industries. The list of exhibitors is long and the space taken is larger than ever before.

In the following is recounted the developments which have made Philadelphia an important center, and following the historical reviews will be found a list of the exhibitors and the main features of the exhibits.

Old Philadelphia, a City of Achievement

Historically Rich, Penn's City Is Industrially Active—Notable Port Facilities—Pioneer in Iron—Important Pig Iron Distributing Center

BY CHARLES LUNDBERG

PHILADELPHIA—founded in 1682 by William Penn—is so rich in historical associations that when its name is mentioned there immediately arises in many minds a mental picture of its venerated Independence Hall, its Liberty Bell and other buildings and objects which carry one back to the swaddling days of the Nation. It has been first in so many things that perhaps it is to be expected that the historical side of the city should dominate with many, often to the exclusion of the fact that the city, the third largest in the Union in population, ranks among the foremost in domestic and foreign commerce and manufacture.

With one-sixtieth of the population of the country, it produces one-twenty-fifth of all the goods manufactured in the United States. Its chamber of commerce has taken for its slogan, "The World's Greatest Workshop." The industrial bureau of the chamber has but little patience with those who lay all the emphasis on the city's relics of the past. Admitting the priceless value of these, its business is to emphasize what the city is accomplishing to-day—the great industries within and contiguous to her borders—her creation of innumerable products, including iron and steel, castings of all sorts, metal products, locomotives, ships and machinery. In the manufacture of textiles Philadelphia stands first.

Philadelphia has close to 10,000 industrial plants, giving employment to over 400,000 workers. Within its borders are 133 foundries, including 74 which melt brass or other non-ferrous metals, either exclusively or as an adjunct to other manufacturing processes. As a city it comes third among those operating foundries. In the city and its suburbs are produced more castings than in any other center in the country. There are 15 steel-casting plants in the vicinity which are notable for their size and capacity. One alone, before the war, made annually 2200 tons of acid and 6500 tons of basic open-hearth steel castings, in addition to 9000 tons of iron and 30 tons of bronze castings. In the city and nearby over $40,000,000 worth of hardware is produced annually, this being about 40 per cent of the country's production.

As a fresh water port open to the ships of the world, and the second port in importance in the United States, Philadelphia is 101.68 miles from the sea, and 61 miles from Delaware Bay, via the Delaware River. It has a 30-ft. channel the full distance and a 35-ft. channel is about two-thirds completed. The city has a water front of 34 miles, 20 along the Delaware and 14 along the Schuylkill Rivers.

The port is served by the Pennsylvania, Philadelphia & Reading, Baltimore & Ohio and Philadelphia Belt Line Railroads, the last-named being a local line which connects all the trunk lines with the piers and which to a large extent eliminates lightering.

Modern Piers and Shipping Facilities

The city owns eight large modern piers for overseas shipment (these being in addition to private facilities) and more are under construction. There are nearly 300 improved wharf and bulkhead structures, 159 of which are projecting piers. The character of the municipal piers is shown by the views herewith. One of the new piers was recently leased by the Cunard Steamship Co., which has established a line plying directly between Philadelphia and Bristol, England. Another new line is that of the International Freighting Corporation, which will maintain a service between Philadelphia and South American ports. A municipal pier on the Delaware, at the foot of McKean Street, has two decks, is 250 ft. wide, 900 ft. long, and has four railroad tracks upon its decks. It is the first of a series of nine which the city will construct. From the city's enterprise along the lines indicated it follows that it and its commercial institutions are keenly alert to the possibilities of a great expansion of its already noteworthy foreign trade, the foundation for which was laid many years ago.

In the fiscal year ended June 30, 1919, a total of 6504 vessels, with a net tonnage of 10,980,182, entered

and cleared at Philadelphia, and the import and export values were $622,643,314. Figures announced by the Board of Commissioners of Navigation show that exports through the port of Philadelphia in the month of June, 1919, had a total valuation of $66,923,919. During June of 1918 exports were valued at $26,786,882, or $40,137,037 less. Despite an insufficient number of ships assigned to the port to meet the requirements of shippers and the necessities of consumers, the total of vessels arriving and clearing in July, 1919, was 241, with a tonnage of 888,574. This was 32 more vessels and 10,321 more tons than the totals of July, 1918.

Railroads Provide Modern Ore Unloaders

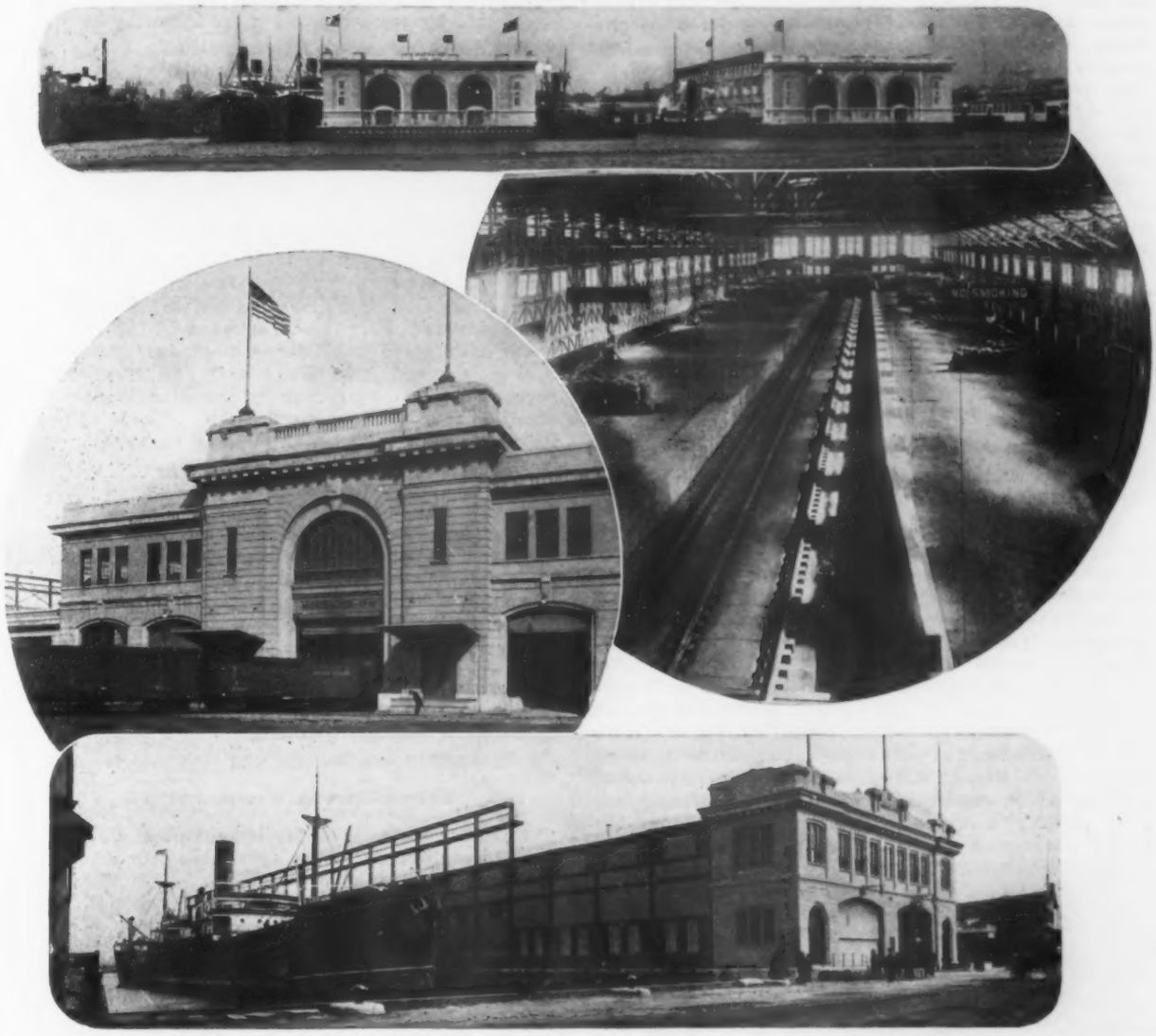
In 1916 manganese ore to the value of $2,297,077 was imported through the port of Philadelphia, and in 1917 to the value of $1,780,715. In 1916 pig iron valued at $2,023,386 came in, and in 1917 there arrived iron valued at $1,935,752. At Port Richmond the Philadelphia & Reading Railway Co. has two electrically operated ore unloaders, and at Girard Point the Pennsylvania Railroad has two unloaders, each capable of discharging 200 tons of ore per hour. The piers and auxiliary apparatus are all modern.

Of the great number of ships built on the Delaware—called the Clyde of America, although during the war more ships were built there than on the Clyde—it is unnecessary to say much. The spectacular manner in which immense shipyards sprang into being for the building of ships to meet the inroads of the German submarines is known the world over. Not far from Philadelphia is the great Hog Island yard, built by the American International Corporation, in connection with which a recent proposal may mean much to the further industrial development of the section. It is proposed that the yard be sold to its builders by the Government for conversion into a great transatlantic terminal. The yard covers 860 acres.

A Pioneer Section in Iron Manufacture

The early history of Philadelphia and eastern Pennsylvania and that of the iron industry on this continent are so closely related that volumes could be wrtten on the subject. When James M. Swank wrote his "History of the Manufacture of Iron in All Ages," he devoted several chapters to the development of the art in eastern Pennsylvania. Philadelphians revere the names of William Penn and Benjamin Franklin, and both had to do with the iron business in its infancy, especially Penn. Indeed, iron was not made in Pennsylvania until after the arrival of Penn in 1682. He was quick to perceive the value of the ore deposits and to urge

Illustrating Philadelphia as the Center of a Great Industrial Region. In the city and its suburbs, these including Chester, are produced more castings than in any other center in the country.



Alive to the Importance of Foreign Trade, Philadelphia, One of the Earliest Factors in American Maritime Activity, Has Built Several Modern Piers. These are served by a belt line railroad with spurs extending out on the piers enabling the transfer of freight from cars to ship.

their utilization, for he had been interested in iron making in England, and later he became the owner of the Andover iron mine in New Jersey.

The first iron mine in Pennsylvania, of which there is authentic record, was in 1692, the quantity being but 40 lb. In 1716 an iron works was successfully established in Berks County, about three miles above Pottstown, by Thomas Rutter, a smith, and, like Penn, an English Quaker. It was a bloomary forge. In 1717 or 1718 another enterprise, known as Coventry forge, was established in the northern part of Chester County by Samuel Nutt, likewise an English Quaker. About 1720 the third iron enterprise, the Colebrookdale furnace, in Berks County, about eight miles north of Pottstown, was established.

Furnaces Made 2 Tons in 24 Hr.

In succeeding years development was rapid, until by 1728 or 1729 it was written that the industry was on a firm basis, there being at that time four blast furnaces in the colony. It was considered quite remarkable that 274 tons of pig iron had been exported to England in this period. At that time two tons in 24 hr. was the production of a Pennsylvania furnace. Benjamin Franklin's stoves, invented in 1742, used plates cast from iron made at the then Warwick furnace on French Creek, in Chester County, which was begun in 1737, and which was operated until 1867, when it was abandoned. Swank wrties:

"The manufacture of iron was not fairly commenced in Pennsylvania until 1716, but after this time it grew rapidly, and in the sixty years which intervened before the commencement of hostilities with the mother country probably sixty blast furnaces and forges and several slitting mills and steel works were built, a rate of progress which was not attained by any other colony in the same period."

Some of the enterprises, such as the Cornwall and Warwick furnaces, were on a scale that would have done credit to a later day. These furnaces were each 32 ft. high, 21½ ft. square at the base, and 11 ft. square at the top. Warwick, it is recorded, was at first 9 ft. wide at the base, but was later reduced to 7½ ft. They produced both pig iron and castings, the latter stoves, pots, kettles, andirons, etc. In hot weather operations were suspended. Water power was used, and the blast was first supplied by large leather bellows, although later wooden cylinders or "tubs" came into use. Some of these bellows were over 20 ft. long. Negro slaves were not infrequently used as labor. After the Revolution the industry received a fresh impetus. The first operation in the Lehigh Valley, a bloomary, was begun about 1805.

The Change from Charcoal to Anthracite

Until 1839 no commercial pig iron was made with anthracite, all of the iron produced coming from charcoal furnaces. Just prior to the year mentioned some men interested in the Lehigh Coal & Navigation Co. went to Wales, where they found considerable progress had been made by David Thomas in smelting with anthracite. Mr. Thomas was induced to come to America, bringing his family with him, and at Catasauqua, Pa., was built a small stone stack which in 1839 was blown in, under the ownership of the Lehigh Crane Iron Co. This subsequently became the Crane Iron Works. The early makers of anthracite iron added one furnace after another until, prior to 1870, they were

operating six, with a total capacity of 1100 tons per week. Of the type of furnace then used probably none is left. The boilers were located near the top of the furnaces to better utilize the gas.

In 1876 was built a set of Whitwell firebrick stoves, these being the first of their type. At that time there existed a string of furnaces in the Lehigh valley extending from Easton to Mauch Chunk and iron was sent to Pittsburgh and Chicago, the furnaces using anthracite and the local hematite ores. Between 1870 and 1880 the practice was inaugurated of mixing coke with the coal. Samuel Thomas, a son of David, succeeded his father, and in 1854 he and his friends established the Thomas Iron Co. at Easton, Pa. W. S. Pilling, of Pilling & Crane, Philadelphia, widely known in the iron trade, was with the Crane company eighteen years, severing his connection with it in 1890 to engage in business for himself. Prior to that time Leonard Peckett, then a chemist, entered the employ of the Crane Iron Works. To-day Mr. Peckett is president of the Empire Steel & Iron Co., which controls the Crane Iron Works.

Robesonia Iron Made in 1793

Several of the blast-furnace companies operating to-day trace their career back well over a hundred years to the days of charcoal fuel, as in the case of the Robesonia Iron Co., Ltd. In a history of the company recently compiled it is stated:

"The first pig iron was made at Robesonia by George Ege, in October, 1793. . . . The town of Robesonia did not then exist; nor was it named until many years later. The furnace at that time was known as Reading Furnace. It was, of course, of small dimensions, and used as a fuel charcoal obtained from the timber cut from Mr. Ege's land. Then, as now, and during the entire intervening period, ore from the famous Cornwall deposit, twenty-five miles distant, was used."

The E. & G. Brooke Iron Co. was founded in 1740 when William Bird erected at a point, now Birdsboro, about 9 miles below Reading, on the Schuylkill River, forges for the manufacture of hammered bar iron. Mark Bird, a son, built Hopewell furnace, about five miles from Birdsboro, about 1760. Before the Revolutionary War he had built a rolling mill, slitting mill and nail factory. In 1837 the business name became E. & G. Brooke, although the family interest extended some distance back. In 1846 Hampton furnace was built, others following in 1852, 1871 and 1873, some of which were subsequently dismantled.

To-day, within a radius of about 100 miles of Philadelphia, are 64 blast furnaces, including those belonging to steel works and those making ferromanganese and spiegeleisen, and the city is a most important distributing center. The furnaces, none of which is further away than Harrisburg, follow:

Blast Furnaces Within 100 Miles of Philadelphia

Name	*Location*	*No. of Stacks*
Alan Wood Iron & Steel Co.	Swedeland	3
Bethlehem Steel Co.	Steelton	6
	Sparrows Point	4
	Lebanon, Donaghmore, Cornwall	7
	Bethlehem	7
E. & G. Brooke Iron Co.	B'rdsboro	1
Carbon Furnace Co.	Perryville	1
Central Iron & Steel Co.	Harrisburg	2
Delaware River Steel Co.	Chester	1
Eastern Steel Co. (Warwick furnaces)	Pottstown	2
Empire Steel & Iron Co.	Catasauqua	2
	Macungie	1
	Oxford (N. J.)	1
	Topton	1
E. J. Lavino Furnace Co.	Lebanon	1
	Marietta	1
	Sheridan	1
Leesport Furnace Co.	Leesport	1
E. E. Marshall (Lochill)	Harrisburg	1
Midvale Steel & Ordnance Co.	Coatesville	3
N. J. Zinc Co.	Hazard, Palmerton (N. J.)	2
Northern Ore Co.	Island Park	1
Reading Iron Co.:		
Keystone Furnace	Reading	1
Crumwold Furnace	Emaus	1
Robesonia Iron Co.	Robesonia	1
Seaboard Steel & Manganese Co.	Temple	2
Singer Mfg. Co.	Stanhope	1
Thomas Iron Co.	Alburtis	2
	Hellerton	1
	Hokendauqua	2
Wharton Steel Co.	Wharton (N. J.)	3

Within the same radius are the following by-product coke plants:

Camden Coke Co., Camden, N. J.
Bethlehem Steel Co., Sparrows Point, Md.
Bethlehem Steel Co., Bethlehem, Pa.
Bethlehem Steel Co., Lebanon, Pa.
Bethlehem Steel Co., Steelton, Pa.
Rainey-Wood Coke Co., Swedeland, Pa.
Seaboard By-Product Coke Co., Newark, N. J.
Philadelphia Suburban Gas & Electric Co., Chester, Pa.

Long Management by Iron-Making Families

One of the earlier firms in the iron business, incidentally a recent addition to the merchant pig-iron field, is the Alan Wood Iron & Steel Co., Conshohocken and Swedeland, Pa. It was founded in 1826 as James Wood & Son, and was later succeeded by the J. Wood & Bros. Co. and Alan Wood & Co., the former being purchased a few years ago by the Alan Wood Iron & Steel Co. In 1911 a merger was effected with the Richard Heckscher & Sons Co., the name Alan Wood Iron & Steel Co. being retained. It is notable that despite the lapse of time and the growth of the company it is still owned and managed by descendants of the founders, both in the case of the Wood and Heckscher companies. The company owns three blast furnaces, making basic and foundry pig iron. It has capacities of 450,000 tons of pig iron per year, 500,000 tons of ingot steel, 125,000 tons of plates, 275,000 tons of billets, blooms and slabs, and 90,000 tons of sheets. A recent development is the recent completion of 110 by-product coke ovens at Swedeland, owned by a subsidiary, the Rainey-Wood Coke Co., which is coking 2000 tons of coal per day with a corresponding output of coke, furnace and foundry and by-products.

Lukens Steel Co. Founded in 1790

From a year-book of the Lukens Steel Co., notable as a pioneer, for its family ownership over a period of four generations, and because it operates the largest plate mill in the world—the mill having a width of 204 in.—the following is taken:

"The actual and original establishment of our works dates back to the year 1790, when Isaac Pennock, the great-grandfather of the present management, built a mill and began the manufacture of iron at a place called Rokeby, situated on Buck Run, Chester County, Pa., about four miles south of Coatesville. . . . The mill he first built was called the 'Federal Slitting Mill,' charcoal slabs being heated in an open charcoal fire, rolled out into plates, and then slit up into rods for general blacksmith use. In 1810 he bought a sawmill property on the Brandywine at Coatesville, which he converted into an iron mill. The mill at that time was called the 'Brandywine,' . . . which has since developed into the large plant at present in operation.

"In 1816 Dr. Charles Lukens, a son-in-law of Isaac Pennock, and maternal grandfather of the present management, came into possession of the property and carried on the business of making iron until his death in 1825. It was between these dates that the first boiler plates produced in this country were made in this mill by Dr. Lukens."

It is interesting to note that after the death of Dr. Lukens at an early age, he was succeeded by his widow, who was an extraordinary business woman.

"After Mrs. Lukens' death the business was conducted by her sons-in-law, Abram Gibbons and Dr. Charles Huston. Mr. Gibbons retired in 1855, . . . leaving the business in the hands of Dr. Huston, who, with his partner, Charles Penrose, carried on the business until Mr. Penrose's death in 1881, they having been joined by Dr. Huston's sons, A. F. and C. L. Huston. Dr. Huston was the head of the concern until his death in 1897."

Philadelphia and Locomotive Building

Since 1834 Baldwin locomotives have been built at Broad and Buttonwood streets, the present site of the Baldwin Locomotive Works. "Old Ironsides," which weighed but five tons, the first locomotive built for road service in Philadelphia, was constructed in Lodge Alley, between Seventh and Eighth streets, by M. W. Baldwin, a manufacturer of stationary engines, and completed

An Accumulation of Slag Extending Back 125 Years. It is from the furnaces of the Robesonia Iron Co., Ltd., a company which traces its origin back to 1793. Some of the stacks which contributed to this "pile" have been long since dismantled.

in 1832. It was patterned after the English locomotives of the day, and was the subject of much favorable comment, but still did not bring the success Mr. Baldwin looked for. In 1834 came an order from the Charleston & Hamburg Railroad Co. for a second engine, and from the experience with the first was evolved a type of engine which was followed for many years.

In the early days there were in Philadelphia at least seven builders, aside from the Baldwin works. One by one the others dropped out for one reason or another and for fifty years the Baldwin Locomotive Works has had the field to itself in Philadelphia. It has grown with the city. The Baldwin company states:

It took from 1832 to 1860 to build the first thousand locomotives; the second thousand was completed in 1869; the third thousand in 1872; the fourth thousand in 1876; the fifth thousand in 1880; the sixth thousand in 1882; the seventh thousand in 1883; the eighth thousand in 1886; the ninth thousand in 1888; the tenth thousand in 1889; the twentieth thousand in 1902; the thirtieth thousand in 1907, and the fortieth thousand in 1913. In 1918 the fiftieth thousand was completed.

The first electric locomotive was built by the Baldwin Locomotive Works in 1895, although this power had been applied to street cars as early as 1888. The first locomotive exported by M. W. Baldwin went to Cuba in 1838, since which time they have gone to practically every country in the world. In 1915 the works exported 475 locomotives, and since then the large number which have been made for export, especially to Europe, where the engines did their part in winning the war, is common knowledge. The company has an immense new plant at Eddystone, but still operates its large Philadelphia plant. The two plants employ 21,500 men, and have a combined production of 3500 locomotives per year. As reported by the Secretary of Internal Affairs, the value of the railroad locomotives produced in Philadelphia County in 1917 was $80,774,700.

Sketch of Philadelphia Foundrymen's Association

TO THE RIGHT IS A PORTRAIT OF THOMAS DEVLIN, PRESIDENT PHILADELPHIA FOUNDRYMEN'S ASSOCIATION, WHILE TO THE LEFT IS ONE OF HOWARD EVANS, SECRETARY SINCE THE ASSOCIATION WAS FOUNDED.

The Philadelphia Foundrymen's Association, one of the earliest organizations of its kind, is an incorporated body which was formed in 1891 for the advancement and protection of the industry. Thomas Devlin, Thomas Devlin Mfg. Co., one of the organizers, has been its president 17 years, and was a vice-president from 1891 to 1894.

The first president was Francis Schumann, of the Tacony Iron & Metal Co., who died in June, 1911. He was followed by P. D. Wanner, Mellert Foundry & Machine Co., and later the Reading Iron Co., and Thomas I. Rankin, Abram Cox Stove Co., both deceased. The vice-presidents included A. C. Pessano, George V. Cresson Co.; James S. Stirling, Harlan & Hollingsworth Co.; A. E. Outerbridge, Jr., William Sellers & Co., and Dr. E. E. Brown, E. E. Brown & Co. Josiah Thompson, J. Thompson & Co., has been treasurer since organization.

The object of the association is "the advancement of the foundry trade by collecting information leading up to the cost of castings and the selling of the same at fair profits." At the same time, much has been done to advance the technical side of the industry. Irregularities in selling prices and costs and labor difficulties demonstrated the need for the organization, although at no time has it attempted to fix wages or selling prices. It was realized, however, that sales were not infrequently made below cost, differences of 2c. to 3c. being common, due to lack of uniformity in estimating costs. The value of the association has been fully demonstrated, benefits accruing not only to the foundrymen, but to their customers.

Thomas Devlin Active Many Years

Mr. Devlin, president of the association, was born in Ireland in 1838. He began his business career in the employ of what is now known as the Philadelphia Hardware & Malleable Iron Works, at that time known as Thomas R. Wood & Co. In 1855 the works were purchased by E. Hall Ogden, who in 1866 admitted three of his employees, Mr. Devlin among them, to partnership. In 1871 the business became the Carr, Crawley &

Devlin Co. In 1880 Mr. Devlin withdrew and with Louis J. McGrath founded at Third and Lehigh streets the firm of Thomas Devlin & Co., which in 1902 became the Thomas Devlin Mfg. Co. Mr. Devlin is to-day in good health, and is active in the management of his business.

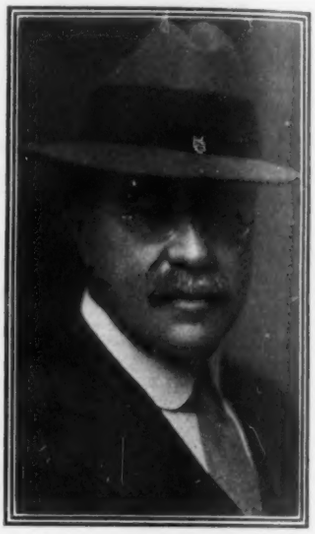
Howard Evans, who has been secretary of the association since its beginning, is vice-president of the J. W. Paxson Co., formerly J. W. Paxson & Co. This company was founded in 1852 to deal in foundry supplies. J. W. Paxson and J. K. Bougher, the founders, with a horse and wagon distributed molding sand brought by boat from Tullytown, Pa., and the district of Lumberton, N. J.

The present officers of the association, aside from those mentioned, are:

Vice-president, George C. Davies, Pilling & Crane; executive committee, Walter Wood, R. D. Wood & Co.; Thomas M. Eynon, the Eynon-Evans Mfg. Co.; H. L. Haldeman, Pulaski Iron Co.; Walter T. Macdonald, Fletcher Works, Inc., and W. T. Dunning, Chester Steel Castings Co., Chester, Pa.; official chemist, George C. Davis, Philadelphia.

Frank Krug, Chairman
Entertainment Committee

C. R. Spare, Chairman
Publicity Committee



Otto W. Schaum, Chairman
Golf Committee

Herbert J. Bougher, Chairman
Automobile Committee

Chairmen of Local Convention Committees

Ex-Officio of All Committees—Thomas Devlin and Howard Evans.

Clearing House Committee—Howard M. Bougher, J. W. Paxson Co.

Information Committee—George F. Pettinos.

Reception and Hotel Committee—Hon. W. C. Sproul, Governor, State of Pennsylvania, honorary chairman; Charles M. Schwab, vice-chairman; H. W. Brown, Tabor Mfg. Co., acting chairman.

Visitation of Plants—George C. Davies, Pilling & Crane.

Publicity Committee—C. R. Spare, American Manganese Bronze Co.

Finance Committee—C. P. Pond, David Lupton Sons Co.

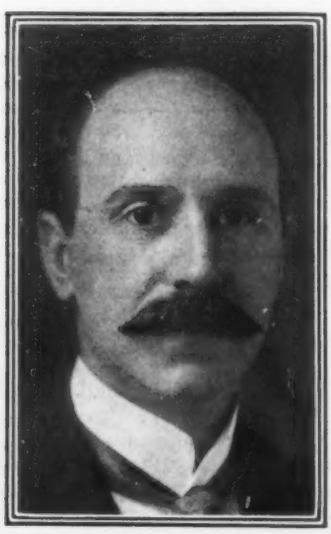
Entertainment Committee—Frank Krug, White & Bro.

Golf Committee—Otto W. Schaum, Fletcher Works.

Daily Bulletin Committee—A. O. Backert, *The Foundry.*

Loan of Automobiles—Herbert J. Bougher, J. W. Paxson Co.

Howard M. Bougher, Chairman
Clearing House Committee



George C. Davies, Chairman
Visitation of Plants Committee

George F. Pettinos, Chairman
Information Committee

Clarke P. Pond, Chairman
Finance Committee

Chester as a Steel Foundry Center

Early Days of Acid Open-Hearth Castings—The First Locomotive, Ship and Gun Castings—Growth of the Industry and Present Status

BY E. F. CONE

THE first steel castings ever made for the American Army and Navy were produced in Chester, Pa. Here also the first locomotive castings were made. The success finally achieved in this phase of steel foundry practice made possible greater and more powerful locomotives and the rapid expansion of the Navy. Though Chester is not a part of Philadelphia, a consideration of Philadelphia proper as a foundry center would not be complete without including the great steel foundry plants of that district.

Conditions which made Chester practically the home of the acid open-hearth steel casting industry of the United States make interesting reading. Prior to 1885 very little if any such casting was done commercially in the United States. The old Midvale Steel Works, now the Nicetown Plant of the Midvale Steel & Ordnance Corporation, made in those days frogs and switches and a few other castings of acid open-hearth steel, but the output was limited. Not until Robert Wetherill founded the Standard Steel Casting Co. at Chester, in 1884-1885 were such castings made commercially in any quantity.

It has been frequently asked whether the founding of a steel foundry industry in Chester was due to the fact that the Baldwin Locomotive Works were located in Philadelphia and because the large shipyards such as Wm. Cramp & Sons Ship & Engine Building Co., in Philadelphia, or the famous Roach shipyard in Chester itself. This was by no means the case. Then locomotives were built without steel castings, and almost none were used in building ships.

The real reason for the evolution of such an industry in Chester was the fact that what was known as McHaffie steel was made there on a fairly large scale. McHaffie steel was really large castings, such as rolls, gears, pinions, etc., of a certain grade of malleable iron. For a number of years the Chester Steel Castings Co., still in existence to-day, and the old Eureka Steel Castings Co., both produced this material, which of course required molders and all that goes with such a foundry industry. It is interesting to note that this particular kind of steel casting was made from a special brand of white iron from England, which was shipped direct to Chester up the Delaware River. Here it was melted in cupolas and poured into molds for castings requiring great wearing properties.

But to make McHaffie metal adaptable to its final use it was necessary to anneal it for several days. This was an expensive and long drawn out process. By surrounding these heavy castings with scale or a similar material, it was possible finally to render the surface machinable and satisfactory.

The use of McHaffie castings was extensive and they filled commercial needs for a time, but later the demand for larger and stronger castings, those that could be made very quickly became insistent. It was a recognition of this need and the appreciation of the fact that steel proper could be cast in molds that inspired Robert Wetherill to build his open-hearth plant for castings.

First Foundry to Make Acid Open-Hearth Castings

Prior to 1884 there existed at Thurlow Station, Chester, a crucible steel casting plant known as the Standard Steel Casting Co. This was purchased in 1884 by Robert Wetherill & Co., Chester, a long-established company making Corliss engines. Robert Wetherill took charge as president and general manager. A 10-ton acid open-hearth furnace was built, replacing the crucible department. This plant claims the distinction of being the first producer in the United States of acid open-hearth castings on any commercial scale.

Not many years later the Chester Steel Castings Co. adopted the acid open-hearth process, but continued its McHaffie department. The old Eureka plant soon followed, becoming some years later the Solid Steel Casting Co. While the former company, "the old Chester," is still a prosperous unit, the latter plant was shut down in the early part of this century and has since been dismantled. For a time it was partly at least under the control of the Pennsylvania Steel Co.

First Steel Frames and Wheels

Only a little over a quarter of a century ago, or early in the 1890's, no locomotives were built using cast-steel frames or wheel centers. Only built-up frames and cast-iron centers were then used. To-day these two items alone constitute one of the chief products of Chester's five major steel foundries. The first order for cast-steel frames was taken by S. A. Watson, general sales agent of the Standard Steel Casting Co., and for many years the leading steel foundry salesman of the industry. It consisted of the after-frames for some switching engines for the Chicago, Rock Island & Pacific Railroad.

The suggestion that frames might possibly be made of cast-steel emanated from an officer of this railroad. This was in 1891-1892. A few were made, but they were only partially successful at first. One that had been welded and successfully bent was exhibited at a convention of railroad men about that time. This was seen by a representative of the Delaware & Hudson Railroad and as a result the first complete set of frames for a shifting engine for this road was made by the Standard company and sent to the Baldwin Locomotive Works at Philadelphia.

Development was similar as to steel wheel centers for driving wheels. These had always been made of cast iron. It was the custom to core the spokes for iron wheels. In 1892 the suggestion was made by Mr. Watson to a prominent railroad man of those days, Samuel Prince, that such wheel centers might be made of cast steel. They were tried, but the cored spoke pattern was used at first. A steel foundryman does not need to use his imagination to picture the trouble that was experienced on the first wheels. Later, as to-day, solid spokes and as few cores as possible became the rule, and there is hardly a foundry in Chester which does not to-day make hundreds of these castings when times are good.

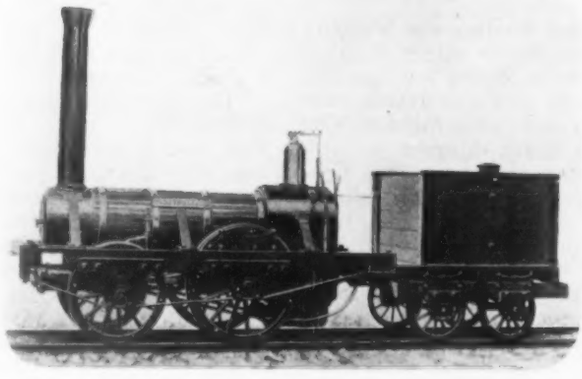
Since then this phase of the steel foundry industry has expanded to unexpected proportions, and only very recently one large Chester foundry made as high as 30 large engine frames a day and turned out 3000 tons a month of finished steel castings. To-day it may safely be said that no locomotives are built without such frames, and that the present size and power of such engines would not be possible except for the development of the steel castings industry which Robert Wetherill and his associates started in Chester about 1885.

Steel Castings and the New Navy

In the early days of shipbuilding, when the Cramp company at Philadelphia and the Roach shipyard at Chester were in full operation, steel castings were little used in the construction of ships. Vessels were not large and naval battleships and cruisers had not been developed. But when the new Navy, under Secretary Whitney, in Grover Cleveland's second administration, was inaugurated, the use of such castings was found

necessary. The first vessels authorized were the Baltimore, the Vesuvius and the Yorktown, and the contracts awarded to the Cramp yard. Lewis Nixon was then assistant naval constructor and through his advice and co-operation, various steel castings were authorized. These were made by the Standard Steel Castings Co., at Chester. Since then nearly all the large stern posts, stems, rudders, engine parts and many other important castings have been made in Chester foundries, making possible the great Navy of the United States.

Important castings were also made a few years later for battleships and cruisers that were being built by various shipbuilding industries around Philadelphia for the Russian, the Argentine and other governments.



The Upper Illustration Represents a Modern Cast Steel Locomotive Frame, 41 ft. 7 in. Long, 6 in. Thick, Weighing 13,250 lb. and Is Representative of the Average Casting of This Kind Made in Chester To-day for Modern Locomotives. As many as 25 to 30 have been turned out per day. Some modern ones have been considerably larger. The section beneath the arrow represents about the size, as to length, of the first cast frame made about 25 years ago. Both reveal graphically the growth of this phase of the industry in Chester. In striking contrast with the steel frame is the view of "Old Ironsides," the first locomotive built by the founder of the Baldwin Locomotive Works. Built in 1832, it weighed about five tons

The First Gun Castings of Steel

In 1887 Congress passed an Act calling for three cast-steel 6-in. breechloading guns, to be made by the crucible, open-hearth or Bessemer process, each to weigh 11,000 lb. Only two were supplied; one made by the Pittsburgh Steel Casting Co., Pittsburgh, from crucible steel, and one by the Standard Steel Casting Co. at Chester, of open-hearth steel. In the Government test the Pittsburgh gun failed on the second round by blowing to pieces. The Standard Steel Casting Co.'s gun stood the test of 10 rounds under severe charges.

Developments since then have been rapid. To-day slides, gun mounts and other ordnance castings are a regular product of the acid and other foundries of Chester.

An account of the steel-casting industry of Chester would not be complete without mentioning the cast-steel anchor industry. For a number of years, and especially during the war, Chester foundries have been the sources of a majority of the anchors made in the United States.

Before the Chester steel foundry interests started to make castings for the locomotives and shipbuilding industries their output was confined to small proportions, consisting mostly of gears, crank cases, grips for cable companies, motor boxes, etc. It rapidly expanded as the success in meeting the demands of these industries grew. Also the growth of the machine tool industry was a large factor in expanding the use of steel castings.

The troubles in the early days encountered in making such castings were many. Blow holes were worse than common; it was the exception to make a casting without them. Aluminum is stated to have been resorted to extensively for use in the molds and in the ladle. Nevertheless, prices for such castings were high. For the wheel centers and locomotive frames it was not uncommon to obtain from 10c. to 25c. per pound.

Growth of the Foundry Industry

Because of the conditions which rapidly led to a demand for steel castings from acid open-hearth furnaces, new foundries in Chester sprang up very fast. As previously stated, two of the oldest foundries in Chester soon started to make open-hearth castings.

In 1892 W. H. Bickley founded the Penn Steel Castings & Machine Co. at Chester. It was managed by Frederick Baldt, one of the pioneers in the industry, and associated at one time not only with the McHaffie foundries but also with Robert Wetherill in his original plant. W. S. Bickley, a son of the senior Bickley, later became president and general manager until he sold it to the Penn-Seaboard Steel Corporation. The Penn plant for many years has had a reputation for high-class work.

Another pioneer in the business was Daniel Eagan, who had a steel foundry in Sharon, Pa. He rapidly rose to prominence in the industry, not only of Chester, but of the country. In the early nineties he and his associates bought out the interests of Robert Wetherill and together with foundries at Alliance, Ohio, Pittsburgh and Sharon, Pa., founded the old American Steel Castings Co.—the first combination of such industries in the country. Its headquarters were in Chester, with offices at the old plant of the Standard Steel Castings Co. It was this organization which formed the nucleus of the present largest combination in the steel foundry business—the American Steel Foundries. James Schwab, Daniel Eagan, S. A. Watson and many others were the original promoters of this organization, formed late in 1901. To the original plants in the American Steel Castings Co. there were added also several large basic open-hearth foundries in the St. Louis and Chicago districts.

In December, 1900, the first heat was made in a new plant in Chester, founded by the present chief executive of the State, Governor Sproul, and known as the Seaboard Steel Castings Co. This plant, also making acid open-hearth castings, has specialized largely in locomotive and machine tool castings. Later it became one of the units of the Penn-Seaboard Steel Corporation of Philadelphia, but to-day it is the Chester Works of the American Locomotive Co. In the early days it

had a capacity of about 800 to 1000 tons of finished castings per month. It will soon be able to make about 2000 to 2500 tons per month.

In 1904 there was established at Chester an acid open-hearth plant known as the Delaware River Steel Casting Co. This was later purchased by the Cramps and is now engaged in making ship and other castings for that company and other varied interests.

There is but one converter steel foundry in the Chester district—that of the Eagan-Rogers Steel & Iron Co., founded about 10 years ago. Its president, Daniel C. Eagan, is a son of the pioneer in the industry, Daniel Eagan, and it has been a prosperous and progressive unit from its inception. Its work for the war in turning out small castings was a feature. It was at this plant that the Stoughton oil-burning cupola was developed.

Electric steel castings have never been made in Chester—a rather unusual fact. Crucible steel castings, however, were quite extensively made by a small plant, the Keystone Steel Castings Co., about 15 to 20 years ago, but later this was converted into one using a 5-ton acid open-hearth furnace under the name of the Atlantic Steel Casting Co. It is still operating.

Not far from Chester several plants were built which were important units in the industry a few years before the war. This was at New Castle, Del. When Frederick Baldt left the Penn Steel Casting & Machine Co. he founded the Baldt Steel Casting Co. at New Castle. The plant later became a part of the Penn-Seaboard Steel Corporation. During the war it was converted into a plate mill which to-day is idle.

Besides this plant there were also at New Castle three smaller converter plants, the Brylgon Steel Casting Co., the Deemer Steel Casting Co. and the American Manganese Steel Co. The latter is the only one which is still operating.

It has taken but 30 years, or practically from 1890, for the acid open-hearth steel casting industry of Chester to expand to its present day proportions. From a small output in the first years it has grown to nearly 150,000 tons of finished castings per year. Before steel castings were extensively used in locomotive construction the quantity purchased by the Baldwin Locomotive Works alone did not total 15 tons a month. Now the castings used by a leading locomotive builder average, in normal times, nearly 8000 tons per month.

The pioneers in this development, Robert Wetherill, Daniel Eagan, Frederick Baldt and W. H. Bickley, have erected a memorial of their achievements in the Chester steel-casting industry. They are all dead except the leader of them, Robert Wetherill, who is now the president of the American Pipe & Construction Co. of Philadelphia. Stupendous was the contribution of this industry to the carrying on of the war. From Chester there flowed thousands of tons of castings for shells, for locomotives, for battle and merchant ships and for machine tools. Their contribution to peaceful developments bids fair to be equally important.

The Foundry and Machine Tool Exhibition

The Philadelphia Commercial Museum, wherein the exhibits of foundry week are to be held, is a public institution developed by the board of trustees of the Philadelphia museums, under city and state legislation and responsible to the Mayor of Philadelphia. It is on the Schuylkill River in West Philadelphia, and occupies three buildings with a total floor space of 200,000 sq. ft. Its objects are to disseminate a wider knowledge and appreciation of the customs and conditions of other nations and to promote commerce with foreign countries. Its work is conducted through three administrative divisions: the foreign trade bureau, the library of commerce and travel and the scientific department. It publishes a weekly publication, known as the Export Bulletin, and a monthly in English and Spanish known as Commercial America.

The following is a list of the exhibitors:

Exhibitors and the Products to Be Displayed

ABRASIVE CO., PHILADELPHIA.—An assortment of sizes, shapes, grains and grades of Electrolon wheels particularly suited to foundry work and a similar assortment of Borolon wheels for steel and other materials of high tensile strength. Exhibit in charge of J. H. Byers, sales manager, assisted by R. Rankin Stagmer and W. Rippien.

ACHESON GRAPHITE CO., NIAGARA FALLS, N. Y.—Threaded Acheson electrodes of type used in electric furnace work for melting steel and other metals; skimmers such as are used in the melting of brass and other copper alloys, and welding electrodes, for both electric welding and cutting. Another feature will be a cross-section of a typical machined electrode joint, showing the close fit to eliminate electrical resistance. Represented by Acheson Smith, vice-president and general manager; Lyman C. Judson and Atwood B. Oatman, sales engineers.

AIR REDUCTION SALES CO. OF NEW YORK.—Airco welding and cutting apparatus, Airco oxygen, Airco acetylene and Airco acetylene generators. Represented by E. L. Mills, A. S. Kinsey, E. M. Sexton, L. A. Sholes, A. R. Ludlow, A. D. Frost, W. P. Roberts, H. F. Weldin, D. Sinclair, B. N. Law, G. Walker.

AJAX METAL CO., PHILADELPHIA.—Ajax-Wyatt electric furnace, and "Shurgrip" yellow brass ingots made in the furnace; a number of Ajax process ingots and a variety of castings, as well as a display of babbitt metals. Represented by G. H. Clamer, vice-president and secretary; William J. Coane, second vice-president and sales manager; C. E. Hopkins, general works superintendent; J. M. Graham, Southern representative; S. E. McClure and J. C. Brightbill; and Boston, New York, Cleveland and Chicago representatives, Frank M. Willeson, A. MacDougall, Louis E. Purnell and John G. Miller.

AMERICAN FOUNDRY EQUIPMENT CO. and THE SAND MIXING MACHINE CO., NEW YORK.—Auto sand cutter, the Humane type rotary table room, a gravity feed barrel, the Wilcharge annealing oven truck and a hammer core machine. Represented by V. E. Minich, Elmer A. Rich, Jr.; Hutton H. Haley, John D. Alexander, Charles G. Smith, Jerome E. Sweet and C. B. Schneible.

AMERICAN GUM PRODUCTS CO., NEW YORK.—Sand molds made with Goulac core binder, and finished castings made from the molds. Represented by Gordon I. Lindsay, president; W. E. Baird, manager foundry, and Salesmen M. F. Coughlin, C. F. Witters and Frank B. Thomas.

AMERICAN KRON SCALE CO., NEW YORK.—A Kron automatic dial platform scale of the type used in foundries. Booth in charge of G. Thomas Harper, district manager, assisted by Arnold Peterson, district engineer, and John J. Kelly, special representative.

AMERICAN MANGANESE BRONZE CO., PHILADELPHIA.—An Olsen 100,000-pound testing machine in operation. Besides this machine the company will have on display high-grade manganese bronze ingots and some intricate castings. Represented by C. R. Spare, vice-president and general manager; T. H. Addie, vice-president and sales manager; C. E. Schley, superintendent; C. J. Bower, salesman.

AMERICAN TOOL WORKS CO., CINCINNATI.—American tools, including sensitive radial drill, motor driven lathe, crank shapers, toolroom lathe, motor driven radial drill and planer. Represented by J. C. Hussey and H. W. Schatz.

AMERICAN WOODWORKING MACHINERY CO., ROCHESTER.—Exhibit of woodworking machines. Represented by R. T. Maston, advertising; G. G. Ely, engineering.

ARCADE MFG. CO., FREEPORT, ILL.—Machines of various sizes, including hand-operated pattern, an air-operated machine and one with jolting features; one pattern of an air squeezer, a combined jolt and squeezer, four different sizes of core jolters, Norcross jarring machine, stripper and the Brillion pouring device. Those who will attend are E. H. Morgan, Charles Morgan, L. L. Munn, Henry Tschernning, master mechanic; R. E. Turnbull, August Christen, G. D. Wolfley and Mentor Wheat, salesmen.

ARMSTRONG CORK CO., PITTSBURGH.—An electric furnace in operation, demonstrating Nonpareil insulating brick for furnaces, ovens, boiler settings, blast mains, etc. There will also be on exhibition corkboard insulation for constant temperature rooms; cork coverings for insulating

cold surfaces generally; high pressure covering for steam lines, etc., and cork machinery isolation for deadening noise.

ARROW FORGING & TOOL WORKS, CHICAGO.—Various shaped chisels used in foundries. Represented by Louis Groessl, N. W. Benedict and H. E. Pollard.

ASBURY GRAPHITE MILLS, ASBURY, N. J.—A rest room containing an exhibit of graphite in the crude state.

AUDUBON WIRE CLOTH CO., INC., AUDUBON, N. J.—Foundry riddles, sieves, wire cloth, screening and wire products. Represented by Robert T. Korb, president; William H. Egee, secretary and treasurer; John D. Heins and John M. Fogerty.

AUSTIN CO., CLEVELAND.—Austin standard models of buildings, drawings and photographs. Represented by G. A. Bryant, general sales manager; Benton Hopkins, advertising manager; G. A. Dodge, layout manager; L. D. Stauffer, New York; J. C. Childs, Philadelphia; W. L. Bailey, Chicago; O. D. Conover.

BARRETT CO., CHICAGO.—Rest room only.

JONATHAN BARTLEY CRUCIBLE CO., TRENTON, N J. Booth. Represented by Lewis H. Lawton, secretary and general manager; S. H. Dougherty, James W. Tighe, Lee T. Ward, M. H. Fike, F. P. Welton, salesmen.

BERKSHIRE MFG. CO., CLEVELAND.—Air squeezer molding machines, equipped with match plate; special cope roll-over attachment; also air squeezer machines with split pattern equipments; vibrators, flask fittings, etc. Represented by M. D. Fraser, manager, and G. L. Cannon.

CHARLES H. BESLY & CO., CHICAGO.—Besly grinders and taps. Represented by E. P. Welles and C. A. Knill.

BLACK DIAMOND SAW & MACHINE WORKS, NATICK, MASS.—Band saw filing and setting machine, circular saw filing machine, vulcan brazing outfit, ball-bearing band saw guide. Represented by W. B. Ambler, sales manager; Edward Gordon, Mr. Anderson and Mr. Strand.

BLYSTONE MFG. CO., CAMBRIDGE SPRINGS, PA.—Blystone sand mixer shown in the exhibit of the J. W. Paxson Co., Philadelphia. Represented by Luther G. Conroe.

CYRUS BORGNER CO., PHILADELPHIA. — Fire brick and special shapes and refractories. Represented by George H. Dickel, Jr., and William C. Gerhard.

BROWN INSTRUMENT CO., PHILADELPHIA.—Complete line of pyrometers, recording thermometers, recording pressure gages, recording tachometers, draft gages, etc. Represented by J. P. Goheen, secretary; C. C. McDermott, L. L. Morley, J. L. Hacker and A. H. Edwards, all of Philadelphia.

BULLARD MACHINE TOOL CO., BRIDGEPORT, CONN.—Bullard 8-in. Mult-Au-Matic. Represented by S. H. Bullard, J. W. Bray, F. B. Smith, John Beirne, J. H. VanYorx, Jr., F. E. Hatch, Jr.

THE CARBORUNDUM CO., NIAGARA FALLS, N. Y.—Carborundum refractories, including cements, Carbofax and Refrax bricks will be demonstrated in a Gilbert & Parker furnace in operation. Carborundum and Aloxite wheels will be shown in operation. Represented by C. E. Hawke, sales manager refractory department; H. E. Kerwin, O. C. Debsen, W. L. Meek, H. G. Kretsehmar and G. T. Estabrook.

CHAMPION FOUNDRY & MACHINE CO., CHICAGO.—Jar roll-over machines for molding and core making, and Champion electric sand riddles. Represented by H. O. Magnuson, T. J. Magnuson and A. Magnuson.

FRANK D. CHASE, INC., CHICAGO.—Views of foundries which this firm have designed. Special display will be made of the new two million dollar foundry of the General Motors Corporation at Saginaw, Mich. Frank D. Chase, A. A. Wickland and M. W. Lee will be present.

CHESAPEAKE IRON WORKS, BALTIMORE.—Chesapeake electric traveling crane as applied to foundry practice. Represented by F. S. Chavannes, president; F. J. Brown, superintendent; C. H. Michel, manager sales department; J. W. Waters, chief engineer; Charles M. O'Brien, sales representative; Frank L. Perry, publicity manager; C. L. Kirk, Pittsburgh; H. L. Mode, New York.

CHICAGO PNEUMATIC TOOL CO., CHICAGO.—Chicago pneumatic air compressor in operation; Boyer clipping and riveting hammers of all sizes; Little Giant air drills and electric drills, electric and pneumatic grinders and other foundry equipment such as sand rammers, pneumatic geared and cylinder hoists, air hose, hose couplings and miscellaneous accessories. The company's representatives in attendance will include W. P. Pressinger, Chicago; A. C. Andresen, manager service section, pneumatic tool division, Chicago; A. M. Brown, Philadelphia; Nelson B. Gatch, New York; R. F. Eissler, Pittsburgh; T. G Smallwood, Cincinnati; Ross Watson, Cleveland; T. G. Slingman, Detroit.

CLEVELAND OSBORN MFG. CO., INC., CLEVELAND.—Stripping plate jolt squeezer machines, roll over and air squeezer jolt molding machines and hand-operated roll over machines. Represented by H. R. Atwater, vice-president and machinery sales manager; E. T. Doddridge, E. W. Jacobi, J. C. Alberts, F. T. Spikerman, R. E. Kiefer, H. E. Deakins, E. J. Byerlein, sales engineers.

CLEVELAND PNEUMATIC TOOL CO., CLEVELAND.—Complete line of foundry tools, consisting of riveting hammers, air drills, piston and rotary, compound and corner types, sand rammers, valve grinding machines, emery grinding machines, air hose couplings, etc. Represented by H. S. Covey, secretary; Arthur Scott, superintendent; Captain F. H. Burr, foreign director of sales; Guy Gregory, New York; F. E. Schwarze, Philadelphia; C. D. Garner, Toronto and Montreal; R. E. Manning, Pittsburgh.

CLIPPER BELT LACER CO., GRAND RAPIDS, MICH.—Clipper belt lacers, belt hooks, twisted rawhide and Fibro waterproof pins. Represented by William F. Kall.

THOMAS E. COALE LUMBER CO., PHILADELPHIA.—Michigan soft cork white pine and California sugar pine. Represented by T. E. Coale, president, and A. W. Anderson.

COMBINED SUPPLY & EQUIPMENT CO., BUFFALO.—Angle Stem and Double Angle single piece, double head chaplets. Represented by S. LeViness, Jr., C. L. Jackson and J. L. Reeves.

COMBUSTION ECONOMY CORPORATION, CHICAGO.—A new design of powdered coal feeding and burning equipment, consisting of a powdered coal feeder, that is designed to give a steady uniform flow of powdered coal which assures a flame in the furnace free from pulsation. A. J. Grindle, president and chief engineer and George Furman, vice-president will represent the company.

CORN PRODUCTS REFINING CO., NEW YORK.—Kordek cores baked in oven in booth. Represented by S. B. Krantz, J. A. Oates, F. G. Faller, Jr., D. T. McGrory, J. M. Remmes and A. L. Kreischer.

CURTIS PNEUMATIC MACHINERY CO., ST. LOUIS.—Electrically driven air compressor unit, pneumatic bridge crane and parts of machines. Represented by C. C. Main and J. Macksey.

DAVENPORT MACHINE & FOUNDRY CO., DAVENPORT, IOWA.—Three large machines, namely, the company's No. 34 combination jolt rockover pattern draw machine, capacity 2500 lb.; No. 22 combination jolt rockover pattern draw machine, capacity 750 lb., and one 30 in. jolt stripper. Represented by J. T. Anderson, superintendent; William Hetzel, secretary and treasurer; A. Ziebarth, engineer; A. V. Magnuson, and Carl Falk, salesmen.

DAVIS-BOURNONVILLE CO., JERSEY CITY, N. J.—Oxy-acetylene welding and cutting apparatus, including stationary and portable equipment, acetylene pressure generators, torches, regulators, the Radiograph and the No. 2 Oxygraph. Represented by W. W. Barnes, Philadelphia, and H. H. Dyer, Cleveland.

DEBEVOISE-ANDERSON CO., NEW YORK.—Coke, pig iron, iron ore, fluor spar, ganister, limestone, etc. Represented by N. Anderson, P. Debevoise and C. K. Sutton, P. Brooks, C. A. Wyatt.

DINGS MAGNETIC SEPARATOR CO., MILWAUKEE, WIS.—Three standard foundry type separators, all equipped with motors for self contained drive. Represented by R. A. Manegold and E. S. Hirschberg.

HENRY DISSTON & SONS, PHILADELPHIA.—Power metal-cutting machines. Represented by W. R. Kendall, manager, metal saw department; Joseph Dorrington, R. T. Harris, H. G. Mackenzie, Harry Dorsey, Harry Bean and Mr. Paul.

STANLEY DOGGETT, INC., NEW YORK.—Foundry specialties, such as Facamold, Perfection parting and facing compound, soapstone, leads, plumbagos, etc. Represented by Stanley Doggett, Stanley H. Doggett, John H. Dede, Henry A. Roffmann.

ELECTRIC FURNACE CO., ALLIANCE, OHIO.—Group of products that are being produced through the medium of the Baily electric non-ferrous metal melting furnace The company will also have motion pictures, showing its brass melting equipment and a film devoted to some of the heat treating furnace installations that were made for the production of essential war materials.

ELECTRIC FURNACE CONSTRUCTION CO., PHILADELPHIA.—Represented by Frank Hodson, president; Frank W. Brooke, vice-president; Herbert H. Twose, secretary-treasurer, and Neil Meville, metallurgist.

EMMERT MFG. CO., WAYNESBORO, PA.—Emmert drafting instrument and adjustable drawing board equipment. Exhibit in charge of Edward Gordon, president and factory sales manager; A. G. Blazier, special demon-

strator will have charge of drawing instrument exhibit. H. S. Kuhn, general manager, will also attend.

FOREIGN CRUCIBLES CORPORATION, NEW YORK.—Genuine French crucibles which have been marketed for the past three years. To be represented by R. N. Stevens and L. J. Rebele.

FOUNDRY APPLIANCE CO., NEW YORK.—F. A. C. cope handling and pattern drawing device, the object of which is the making of molds by rendering unnecessary the skill required in handling the cope and plate on difficult patterns as well as to eliminate the heavy work entailed in lifting the cope. The machine will be in operation at the plant of the Universal Caster & Foundry Co., Philadelphia. J. N. Frantz will represent the company.

FOUNDRY EQUIPMENT CO., CLEVELAND.—All types of Coleman core and mold ovens and photographs of installed ovens. Represented by F. A. Coleman, vice-president; C. A. Barnett, treasurer.

GARDNER MACHINE CO., BELOIT, WIS.—New Reeves roll grinder, a machine for the accurate grinding of cylindrical rolls without centering them in operation; also the No. 7½ Gardner grinder, a single spindle machine equipped with 30-in. disk wheels and the No. 50 heavy duty Gardner grinder, also equipped with 30-in. disk wheels will be shown under power. An added feature will be the Gardner No. 24 vertical spindle disk grinder, carrying a 53-in. disk wheel in operation. Represented by W. B. Leishman, treasurer and sales manager; W. L. Townsend, sales engineer; H. C. Steinbuck, demonstrator; F. M. Risler and A. A. Swinnerton.

GENERAL ELECTRIC CO., SCHENECTADY, N. Y.—A WD-9 arc welding set, a cupola blower and a standard compressor having a 30 hp. motor and a capacity of 4500 cu. ft. of free air per min. with 1 lb. pressure when operating 3450 r.p.m. Represented by J. M. Hollister, B. L. Spain, B. C. Tracy, L. W. Shugg, Edmond Van Steeg and C. K. West.

ROBERT GORDON, INC., CHICAGO.—Mechanical hot blast heater including the Multi-vane blower in operation. This line is entirely new in the heating and ventilating field, having been developed within the last year. Represented by T. H. Monaghan, president and general manager; H. H. Engle, sales manager; R. M. Zimmerman.

GRACETON COKE CO., GRACETON, PA.—Specimens of foundry coke and some of the war equipment manufactured through the use of Graceton foundry coke.

GREAT WESTERN MFG. CO., LEAVENWORTH, KAN.—Type V gyratory foundry riddle with iron frame; type V gyratory foundry riddle with hickory frame; type CR gyratory foundry riddle and type CS gyratory foundry riddle; also an assortment of renewable bottom sieves. Represented by F. A. Pickett, secretary; George W. Coombs, Superintendent.

GRIMES MOLDING MACHINE CO., DETROIT.—New Model K jolt-rammed roll-over molding machine and a Grimes hand-rammed roll-over molding machine. To be represented by George L. Grimes, L. V. Grimes, Charles J. Skeffington and Oswald Carliss.

HANNA ENGINEERING WORKS, CHICAGO.—New combination jolt split pattern machine, showing machine fitted with automatic, slow-start oil pattern draft cylinder, controlled by a knee valve, giving smooth, slow start for the first three-quarters of an inch, with a rapid finish for the balance of the pattern draw, thereby leaving the operator's hands entirely free to pick up the mold the instant the pattern is drawn. While the mold is being carried to the floor, the flask frame settles to its original position and the machine is ready for its next flask. Represented by P. W. Gates, president; James T. Lee, vice-president; O. F. Weiss, Philadelphia, and J. O. Clark.

CLEMENT A. HARDY CO., CHICAGO.—Photographs and blue prints of foundries which this firm of consulting and contracting engineers has built or now has under construction. Represented by C. A. Hardy.

F. A. HARDY & CO., CHICAGO.—Complete line of safety goggles, as well as the company's new line of safety signs, gloves, leggings and other safety and welfare equipment. Exhibit in charge of A. U. Barnes, New York.

BENJAMIN HARRIS & CO., CHICAGO.—Yellow brass and composition ingots. Represented by Louis Goldman, vice-president, assisted by Nate Harris, treasurer, and Oscar Harris, secretary.

HAUCK MFG. CO., BROOKLYN.—Oil-burning apparatus, including hand kerosene torches, rivet forge, brazing and blacksmith forge, high and low pressure furnace burners, preheaters for welding, soldering-iron heating furnaces. Represented by Arthur E. Hauck, A. H. Stein, W. H. Fitzpatrick, H. H. Kress, G. N. Broadhurst, G. T. Shanley, F. E. Giersch and A. N. Thomson.

HAUSFELD CO., HARRISON, OHIO.—Hausfeld non-crucible furnace of the tilting type, and the crucible furnace of the tilting type; the stationary crucible furnace and the Hausfeld aluminum melting furnace of the tilting type, using cast-iron melting pot; the Hausfeld oil feeder attachment and motor-driven pump unit; the Hausfeld ladle and crucible heater and Hausfeld ingot molds. Represented by E. B. Hausfeld, president; Joseph E. Hausfeld, treasurer, and J. S. Armour, manager furnace department.

HAYWARD CO., NEW YORK.—Working models of clam shell and orange peel buckets. Represented by C. F. Hutchings.

HEALD MACHINE COMPANY, WORCESTER.—No. 70 internal grinder, No. 85 internal grinder, No. 22 12-in. rotary surface grinder, No. 60 cylinder grinder and magnetic chucks. The No. 85 internal grinder is a new small-size machine which has never been exhibited. First deliveries of these machines will be made about Nov. 1. Exhibit will be in charge of S. M. Hershey, Philadelphia manager.

ALFRED HERBERT, LTD., NEW YORK.—Combination turret lathe for chuck work, hexagon turret lathe for bar work, a Lumsden oscillating tool grinder for grinding high-speed steel, etc., and a Lumsden plain ball-bearing cup-wheel grinder for service in connection with the Lumsden oscillator in touching up tools by hand after hardening and a Coventry patent concentric chuck. There will also be exhibited high-speed steel, twist drills and milling cutters. Represented by C. J. Albin, James Blair, E. G. Blake, Felix Harmer, Arthur G. Thornton, C. R. White.

HERMAN PNEUMATIC MACHINE CO., PITTSBURGH.—A 40- x 50-in. plain jarring machine, with the table plate lifted off of the base, showing the interior. Represented by Thomas Kaveny, president; H. T. Frauenheim treasurer; Robert Ringle, works manager; I. J. Oesterling, assistant works manager; and R. P. Morgan, Robert Porteous, Walter Hughes, C. S. McMath, C. W. Miller, service department representatives.

HOEVEL MFG. CORPORATION, JERSEY CITY, N. J.—A sand blast barrel machine and sand blast table machine in operation. Represented by H. F. Hoevel and L. B. Passmore, and others.

HOLCROFT & CO., DETROIT.—Photographs, drawings and data on various types of metallurgical furnaces and foundry ovens; also data on special electric furnaces. Those in attendance will be Charles T. Holcroft, president; E. V. Holcroft, manager Eastern territory; W. H. Holcroft, H. L. Ritts, sales engineers, and Harry Holcroft.

HYATT ROLLER BEARING CO., NEW YORK.—A complete line of Hyatt roller bearings of all types and sizes; a large revolving model of the Hyatt roller bearing, showing the principles of design and construction; a Hyatt roller bearing mounted in glass, showing the lubrication principles of the bearing; an automatic lantern slide machine, showing pictures of Hyatt roller bearing equipped machinery, and a truck test stand having Hyatt roller bearing equipped trucks and plain bearing trucks. Those in attendance will be D. Gleisen, manager; P. C. Gunion, advertising manager; M. F. Lawrence, sales promotion manager; G. O. Helmstaedter, manager general applications department; W. L. Iliff, J. M. Hancock and H. L. Littell, Philadelphia.

INDUSTRIAL ELECTRIC FURNACE CO., CHICAGO.—Pictures and literature describing not only the company's newest types of electric furnaces, but also the new process of pre-heating steel, by which the same class of scrap can be used as in the present electrical process, and the electrical consumption reduced 40 per cent, with an increase of 50 per cent in output from furnace. Illustrations will also be shown of the new Lewis jolt shakeout machine. The purpose of this machine is not only to save labor, but space in the foundry, and to make the separation of sand from casting and flask systematic. Represented by F. von Schlegell and W. B. Lewis.

INGERSOLL-RAND CO., NEW YORK.—Air motor, air cushion hoist, pneumatic sand rammers, chipping hammers, grinders and core breakers and pneumatic tools. Represented by W. A. Johnson, assistant and acting manager; W. B. Brendlinger, P. J. Christy, N. A. Pelham, L. W. Schnitzer, of the pneumatic tool sales department.

INTERNATIONAL MACHINE TOOL CO., INDIANAPOLIS.—A 16-18-in. type "A" Libby lathe, motor driven, tooled up for machining gear blanks. Exhibition in charge of the company's Philadelphia representative; the Vandyck-Churchill Co., assisted by the special representative, J. A. Villard.

INTERNATIONAL MOLDING MACHINE CO., CHICAGO.—Complete line of machines, consisting of hand and power turn-over machines, jarring machines, squeezers, stripping plate machines, and many different types of combination machines. Represented by Edward A. Pridmore, president; W. W. Miller, vice-president; F. W. Hamel, sales agent; E. G. Borgnis, sales agent.

JENNISON-WRIGHT CO., TOLEDO, OHIO.—Samples of Kreolite wood blocks for factory floors, together with en-

larged photographs showing these wood block floors in leading foundries. Exhibit in charge of F. E. Jennison, Chicago, and L. P. Drinker, Philadelphia.

KELLER PNEUMATIC TOOL CO., CHICAGO.—An enlarged sectionalized model of a Keller-Master riveting hammer, mounted in a heavy gilt frame, all moving parts mechanically actuated in the same manner as when operated by compressed air in a standard hammer; also sectionalized drills and other pneumatic tools in operation, together with a display of complete models of Keller-Master sand rammers, riveting and chipping hammers, valve and valveless drills, jam riveters, holders-on, etc. Represented by W. H. Keller, president and general manager; J. G. Osgood, general sales manager; J. C. Campbell, manager railroad department; G. E. McCabe, advertising manager; F. S. Eggleston, Jr., New England territory; H. C. Browne, New York; J. W. Smith and Jerome Eppstein, traveling representatives; W. J. Devlin, C. A. Bremmer and L. B. Smyser, Philadelphia; Edward L. Lycett, Philadelphia; A. G. Swope, A. M. Andresen, E. E. Knox, Pittsburgh; W. H. Woody, Washington.

SPENCER KELLOGG & SONS, INC., BUFFALO.—Some unique cores and castings representing the latest developments in the automobile and aeroplane motors; will also have stock samples of various grades of core oil, and will have on hand a staff of experts who will discuss and advise on foundry problems. The following will attend: V. H. Hunter, general sales manager, Buffalo; U. L. Throm, Buffalo; A. P. Mason, New England representative; J. L. Yaeger, Middle Western representative; W. L. Goetz, Buffalo; E. G. Allen, Ohio representative; Burt Cox, Michigan representative.

T. P. KELLY & CO., INC., NEW YORK.—Rest room with the following representatives of the company on hand: V. J. Rohe, sales manager; H. J. Winters, Philadelphia; B. H. Forman, salesman; H. F. Maurel, treasurer; W. F. Kaine, president.

KEMPSMITH MFG. CO., MILWAUKEE.—Represented in the booth of the Vandyck-Churchill Co. Will show No. 4 Maximiller.

KLAXON CO., NEW YORK.—The Klaxocator, an improved code calling device for locating men at any point in a plant; a complete line of industrial Klaxon horns for all signaling purposes around plants, and the Klaxophone, which is a loud speaking telephone for quick, convenient intercommunication. Those in attendance will be E. Berg, manager; P. C. Gunion, advertising manager; R. L. Wilkinson, asisstant sales manager, and A. W. Hall, engineer, Pittsburgh district.

C. E. KNOEPPEL & CO., INC., NEW YORK.—Graphic production control boards for the control of the many factors affecting foundry operation and production. By this method the movement of material, application of labor, the use of equipment and machines, and the furnishing records of plant conditions and performances for cost analysis, can be controlled. Represented by C. E. Knoeppel, president; J. P. Jordan, vice-president, and Irving A. Berndt.

H. M. LANE CO., DETROIT.—Photographs and drawings of some of the company's work, as well as of devices which have been designed for this company's plants. Represented by H. M. Lane, president; A. O. Thomas, vice-president; Benjamin Towlen, secretary-treasurer; Charles R. Seabrook, structural engineer; D. W. F. Nichols, architect; Charles Rochefort, mechanical engineer.

LEEDS & NORTHRUP CO., PHILADELPHIA.—Optical pyrometer for use in the determination of the temperatures of molten metal and all bodies whose temperatures lie above 1200 degs. Fahr., also multiple point recorder and indicating pyrometers for determining the temperature of core ovens. Represented by G. W. Tall, Jr.

LIBERTY STEEL PRODUCTS CO., CHICAGO.—Clark truck tractor fitted with standard foundry dump body, suitable for hauling castings, sand, patterns or other materials. Practical demonstrations will be made. Two Steubing lift-trucks, especially adapted to foundry and factory use, will also be shown. A miniature Stefco standardized steel building will be another feature. Represented by S. W. Midgley, Chicago district manager; C. K. Drury, manager of Steubing truck department; W. W. Robbins, manager steel building department; T. L. Lowrey, Pittsburgh; W. S. Ottinger, Philadelphia; A. H. Dillon, Jr., Philadelphia.

LINCOLN ELECTRIC CO., CLEVELAND.—Operating exhibit of the company's latest type of arc welding apparatus adapted particularly to foundry use. Represented by Dorsey C. Anderson, Philadelphia; R. E. Kinkead, engineer welding department, Cleveland; O. P. Lang and P. C. Pipes, welding application engineers.

LINDSAY CHAPLET & MFG. CO., PHILADELPHIA.—Chaplets of all sizes and styles. Represented by James C. Newlin, Jr., vice-president; Stanley B. Wentz, Herman E. Mandel.

LINK-BELT CO., PHILADELPHIA.—A Rapp revivifier for reviving molding sand. It reclaims used molding sand, tempers and mixes it and prepares it for further use. Also a Link-Belt overhead monorail electric hoist equipped with cord-operated foundry control, as required for handling molds and cores without damage. It will be connected to a 220-volt d.c. circuit. This part of the exhibit will be looked after by the company's hoist engineer, James Monroe. Another feature of the exhibit will be a Link-Belt silent chain drive in operation, and this part of the exhibit will be handled by L. Spillan, drive chain engineer. F. F. Walchter will also be present.

LOUDEN MACHINERY CO., FAIRFIELD, IOWA.—Complete exhibit of overhead track, trolleys and special equipment. A feature of the display will be new ball-bearing trolleys which represent a family of overhead trolleys ranging from 2 to 16 wheels, and adapted to all material-handling propositions. Represented by L. E. Gaston, H. W. Cuddy, L. F. Berthold, C. S. Doron.

DAVID LUPTON'S SONS CO., PHILADELPHIA.—Small size samples of different types of Lupton's sash, and a small run of Pond continuous sash, showing its adaptability to use in foundries, forge shops and in heat-producing buildings; small samples of steel equipment for factories, toolrooms, etc., including factory desks, bench drawers and storage equipment will also be shown. Those who will be in attendance are Clarke P. Pond, sales manager; Charles F. P. Buckwalter, assistant sales manager; H. R. Wilkinson, New York; R. A. Sanborn, Chicago.

J. S. McCORMICK CO., PITTSBURGH.—Sand mixing machine, pattern plate machine and an electric magnetic separator in operation. Vulcan and Ajax blackings will also be exhibited. Represented by J. S. McCormick, president; T. E. Malone, secretary, and S. R. Costley.

McCROSKY TOOL CORPORATION, MEADVILLE, PA.—Complete line of adjustable reamers, also Quick-Change chucks and collets in actual operation, by which drilling, reaming, tapping or any other series of operations may be quickly performed without stopping the drill press to change tools. Exhibit will also include McCrosky turret tool posts and Searchlight universal lamp brackets for general factory use. Represented by C. M. Sutton, C. Harper Halfmann and M. J. Foulk.

McLAIN'S SYSTEM, INC., MILWAUKEE.—Samples of semi-steel castings of light sections, such as automobile cylinders containing from 20 to 30 per cent steel; gears, pistons, projectiles and other samples of semi-steel castings containing from 20 to 50 per cent steel; also open-hearth steel castings poured from metal made in the McLain-Carter oil-fired, open-hearth furnace. Represented by David McLain, president; I. V. Scanlan, secretary and treasurer, and Harry McLain.

THE MacLEOD CO., CINCINNATI.—Sand blast tumbling barrels and portable oil-burning equipment for skin drying, lighting cupolas and similar work. Representative in charge, Harry Rittmeyer.

MAGNETIC MFG. CO., MILWAUKEE.—A type F No. 2 Magnetic separator in operation. This separator is used in gray iron and steel foundries for reclaiming iron from foundry refuse. The company's type L No. 1 Magnetic separator, which operates on alternating current, also to be shown. A type L Magnetic separator operating on direct current is to be another feature. Represented by R. H. Stearns.

MALLEABLE IRON FITTINGS CO., BRANFORD, CONN.—A small frame showing vibrators in operation; also a full line of vibrator accessories, such as blow guns, knee valves, sprayers, etc. This company will also have a new vibrator core bench, especially adapted for rapid production of cores by the multiple system. An operator will demonstrate the making of cores with this device. Represented by G. B. Pickop, assistant superintendent, and a representative of the J. Jacob Shannon Co., of Philadelphia, distributor of Branford vibrator equipment.

MARDEN, ORTH & HASTINGS CORPORATION, NEW YORK.—Reception booth and will show cores made with its liquid and powdered Mohtan sand binder, together with samples of those materials. Represented by George N. Moore and H. M. Handy.

ARTHUR C. MASON, INC., HAWTHORNE, N. J.—High speed, quick change, sensitive bench drills. C. A. Widmer, sales manager, will be in attendance.

MAXON-PREMIX BURNER CO., MUNCIE, IND.—Oil and gas burning crucible brass furnace, and oil and gas burners.

MERCURY MFG. CO., CHICAGO.—Four-wheel tractor, a three-wheel tractor, two trucks and a charging outfit. Represented by J. S. Kunkle, W. W. Geiser, E. S. McNaul, L. R. Duffield, of New York office, and C. H. Clare.

METAL & THERMIT CORPORATION, NEW YORK.—Transparencies and photographs showing the various applications of Thermit for welding and demonstrating the use of Thermit for pipes. A full set of heating cans for foundry work will be displayed, together with small welds. Represented by W. R. Hulbert, sales manager, Thermit department; A. F. Braid, sales manager, metals and alloys department; H. G. Spilsbury, metallurgical engineer; J. G. McCarty, traveling representative; H. D. Kelley, Pittsburgh.

MICHIGAN SMELTING & REFINING CO., DETROIT.—Products for the production, reclamation, manufacture and sale of non-ferrous metals. Represented by Norman Sillman, vice-president; Henry Levitt, secretary; F. C. Bahr, general manager; C. T. Bragg, works manager; R. H. Evans, advertising manager; R. R. Arnold, William Eitel, H. E. Berliner, W. E. Elmore.

MIFFLIN CHEMICAL CORPORATION, PHILADELPHIA.—A display of core-binders, together with cores made from the same.

ALEXANDER MILBURN CO., BALTIMORE.—Full line of Milburn oxy-acetylene welding and cutting apparatus, portable lights and pre-heaters. Represented by A. F. Jenkins, president; R. H. Gernand, New York; E. C. McNutt, Pittsburgh.

MINE & SMELTER SUPPLY CO., NEW YORK.—A small Wilfley concentrating table working on the separation of metallics from brass foundry ashes, in operation. This booth will also show several types of crushers, oil burners, refractory clay goods and other equipment used in the brass foundry. Exhibit in charge of E. S. Tompkins, sales manager, assisted by John C. Beam, sales engineer.

MONARCH ENGINEERING & MFG. CO., BALTIMORE.—Non-crucible furnaces of various types, a tilting coke furnace with crucible, a tilting oil furnace with crucible, core ovens with both oil, gas and coke fire, a ladle heater and a stationary oil or gas fired steel furnace, all new developments, will be shown for the first time. Represented by H. D. Harvey, James J. Allen, Frank P. Maujean and William Raber.

MONARCH MACHINERY CO., PHILADELPHIA.—Milling machines from the Rockford Milling Machine Co. and Gooley & Edlund, Inc.; a lathe of the Monarch Machine Tool Co.; manufacturing lathe from Rockford Tool Co.; a shaper from the Cincinnati Shaper Co., and drill presses manufactured by Minster Machine Co., Weigel Machine Tool Co. and Edlund Machinery Co. The company will be represented by E. R. Mack, A. H. Campbell, R. L. Arms, H. M. Shaw, A. J. Berger, A. W. Heppard, E. W. Stegman.

MOTT SAND BLAST MFG. CO., BROOKLYN. — Type P.E.S. sand blast barrel in operation; will also have in operation one of the company's latest types cloth screen dust arrester, with complete line of accessories, such as hose, helmets, nozzles, gloves, etc. Represented by David Mayer, president; E. J. Rosenthal, vice-president; E. C. Gilmour, sales manager; R. E. Donnelly, sales representative.

NAPIER SAW WORKS, INC., SPRINGFIELD, MASS.—Napier metal cutting machines and Quality and Expert hack saws. Represented by A. C. Whitefield, H. M. Reynolds and H. G. Doering.

NATIONAL ENGINEERING CO., CHICAGO.—Three sizes of Simpson intensive foundry mixers which are being used by foundries for economical and efficient mixing of facing sand, core sand and other foundry sand mixtures. No. 2 mixer will be in operation mixing foundry sand.

NEW CHICAGO CRUCIBLE CO., CHICAGO.—Graphite crucibles, stopper heads and boxes. Represented by Dr. Sherman Taylor, president; A. F. Hottinger, secretary-treasurer; L. C. Taylor, superintendent; J. P. Foraker and J. W. Mann, salesmen.

NORMA CO. OF AMERICA, NEW YORK.—Norma precision ball bearings, which are used in connection with fractional horse-power electric motors, high-speed grinders, high-speed portable electric drills, high-speed sensitive drill presses, spindles of high-speed grinding machines, radio apparatus, gyroscopic apparatus, tachometers, etc. Those in attendance will be Norman Bell, sales engineer; Arthur Meder, sales engineer; D. E. Batesole, engineering department, and George R. Bott, engineering manager.

NORTON CO., WORCESTER, MASS.—A 6 x 32 in. Norton plain cylindrical machine in operation; 2 in. model D floor stand; 1¼ in. model D floor stand; ¾ in. model D bench machine, motor driven, and No. 1 Norton universal tool and cutter grinder, with an exhibit of tool and cutter grinding wheels; also an exhibit of Alundum and Crystolon grinding wheels, such as are used in foundries. Representatives in attendance S. A. Craig, Philadelphia; W. R. Strong, Philadelphia; E. F. Anderson, Philadelphia; Herbert Duckworth, sales manager, grinding wheel division; Wallace T. Montague, assistant sales manager, grinding wheel division; E. W. Barnes; C. H. Wood.

S. OBERMAYER CO., CHICAGO.—Core oven, sprue cutter, ladles, tumbling barrel, bellows, shovels and a demonstration of Hott Patch furnace cement, in connection with which an electric furnace heated to 3600 degrees will be used. Pyrometers will be used in testing the heat-resisting qualities of the cement. Represented by S. D. Johnston, E. D. Frohman, J. L. Cummings, William Fitzpatrick, J. J. McDevitt, W. J. Adams, I. D. Adams, William Fenton, J. E. Evans, O. J. Peterson, O. C. Olson, C. M. Barker.

OHIO BLOWER CO., CLEVELAND.—Swartwout steel core ovens, rotary ball bearing ventilators, Swartwout Helico centrifugal air separators, air traps and the Swartwout "Gasoil" burner. T. D. Johnson will be in charge of the exhibit, assisted by George H. Thompson, manager of New York office, and Messrs. Bogardus, Brandt, Vannote and Whitaker, of the Philadelphia branch.

GEORGE OLDHAM & SON CO., PHILADELPHIA.—Complete line of pneumatic tools for use in the foundry, including chipping hammers, core busters and foundry rammers, together with accessories. Messrs. Fraser and Biles in attendance.

OLIVER MACHINERY CO., GRAND RAPIDS, MICH.—A complete pattern shop in operation showing the Oliver wood milling machine and other Oliver machines. Represented by R. F. Baldwin, treasurer; Arthur Balke, Eastern manager; G. C. Conklin, Chicago manager; Dolph De Young, general superintendent; A. S. Kurkjian, sales manager; J. Ray Bate, demonstrator; Arie Steenbergen, operator; and J. E. McLauchlen, C. R. Crossley, C. A. Ginter, sales engineers.

OXWELD ACETYLENE CO., NEWARK, N. J.—Complete line of oxy-acetylene apparatus, generators, blow pipes, cutters. Represented by W. E. Cotter, W. B. Wilson, G. R. Mitchell, P. A. L. Maurhoff, F. W. Smith, C. A. Bradburn, J. J. Bruton, F. M. Mather, J. B. Kissam.

PANGBORN CORPORATION, HAGERSTOWN, MD.—Equipment in operation will include various types and sizes of cabinet sand blasts, rotary table sand blasts, hose machines, sand separators, dust arresters and exhausters. A stereopticon will demonstrate actual installations which have been made throughout the country. The company will be represented by Thomas W. Pangborn, president; John C. Pangborn, vice-president; Harry D. Gates, sales promotion engineer; W. C. Lytle, sales engineer; P. J. Potter, George A. Cooley, Charles T. Bird, Jesse J. Bowen, Roy C. Koch, J. F. Tracey, T. R. Ditty, district sales engineers; Hugo F. Liedtke, designing engineer, Foster J. Hull, erecting engineer.

J. W. PAXSON CO., PHILADELPHIA.—A complete line of foundry supplies and equipment will be shown and the following will represent the company: H. M. Bougher, president; Howard Evans, vice-president and I. F. Kremer.

CHARLES E. PETTINOS, NEW YORK.—Various products illustrating foundry and molding sand operations, together with graphites and plumbago. Represented by Charles E. Pettinos, J. H. Bing, M. M. Houskeeper and a few others.

GEORGE F. PETTINOS, PHILADELPHIA.—Reception booth in charge of George F. Pettinos, H. B. Taylor, Jr., and members of sales staff.

PHILADELPHIA GREASE MFG. CO., PHILADELPHIA.—Grease in all its different densities which are used for all classes of lubrication. Represented by Horace A. Smith, secretary, and Messrs. Dean, Hodgman and Munday.

PICKANDS, BROWN & CO., CHICAGO.—Exhibit, as in former years, will be in conjunction with the Semet-Solvay Co. and will consist of Solvay Coke. A front view of Independence Hall will be constructed of coke. There will be in attendance: George A. T. Long, foundry expert; Thomas W. Glasscot, sales representative; James A. Galligan, sales agent; and from the Semet-Solvay Co. will be James A. Ballard, sales manager from Detroit, and William H. Ball, coal and coke agent, Syracuse, N. Y.

PITTSBURGH CRUSHED STEEL CO., PITTSBURGH.—Exhibit under the name of the Metallic Abrasive Manufacturers Association of America will consist of metallic Abrasives for sand blasting. Represented by G. H. Kann, president Pittsburgh Crushed Steel Co., Pittsburgh; N. C. Harrison, treasurer Harrison Supply Co., Boston; H. M. Ream, manager Globe Steel Co., Mansfield, Ohio; I. A. Diamondstone, manager Harrison Bros., Inc., Amesbury, Mass.; R. S. Kann, sales agent Pittsburgh Crushed Steel Co., Pittsburgh.

PORTAGE SILICA COMPANY, YOUNGSTOWN, OHIO.—Photographs of company's plant, samples of conglomerate rock in its natural state and samples of the various products, namely steel molding, sand blasting, core and filter silica sands. Represented by E. E. Klooz and L. R. Farrell, secretary.

HENRY E. PRIDMORE, CHICAGO.—Electric operated molding machines, plain electric jolt machines, jolt strip and jolt roll-over and hand roll-over and hand stripping plate machine. Represented by Mrs. Henry E. Pridmore, president; H. A. Pridmore, vice-president; George Furman, general manager; H. G. Schlichter, superintendent; D. F. Eagan, Eastern representative; C. H. Ellis, Central States representative; J. W. Dopp, J. W. Dopp Co., Detroit; Hugh Gallagher, Western representative, and Marshall E. Pridmore.

QUIGLEY FURNACE SPECIALTIES CO., NEW YORK.—Demonstration of the use of Hytempite, Carbosand, and Insulbrix. Representatives in attendance will be W. S. Quigley, president; J. H. McPadden, secretary; L. G. McPhee, sales manager; H. M. Miller, C. E. Pullum, George R. Powell, C. E. Klein, F. W. Reisman, S. D. Enoch, F. G. Wenzel and C. Gantzman.

RACINE TOOL & MACHINE CO., RACINE, WIS.—Three types, high speed metal cutting machines of various capacities, high speed rail cutting machine and high speed tire cutting machine. Represented by F. J. Kidd, manager; William Reinhardt, superintendent; and T. A. Hyde, E. R. Larson, A. H. Goetz, D. B. Maxwell, Ralph Maxwell and N. R. Petersen.

W. J. RAINEY, NEW YORK.—Exhibit of Rainey Connellsville beehive and rectangular oven foundry coke; also by-product foundry and furnace coke and domestic coke. Photographs showing operations producing various grades of fuel will be shown. Represented by A. F. Kempe, Philadelphia sales manager, assisted by R. I. Willcox, foundry coke sales manager; H. B. Prescott, Pittsburgh sales manager; and W. H. Vermilya.

REPUBLIC CREOSOTING COMPANY, INDIANAPOLIS, will show interior wood block floors. Represented by H. G. Stephens and G. Nelson.

RICHARDS-WILCOX MFG. CO., AURORA, ILL.—Overway carrying systems of mono-rail track, both trolley and I-beam types, switches turntables, cross-overs, trolleys, traveling cranes, hoists, etc. Represented by A. J. Eggleston, manager, engineering service dept.; and E. J. G. Phillips, chief engineer.

ROBESON PROCESS CO., NEW YORK.—Various types of cores bound with glutrin core binder. Represented by G. I. Lindsay, president; C. A. Rapallo, secretary; T. J. Ryan, T. J. O'Hara.

ROGERS BROWN & CO., CINCINNATI.—Intricate, finished iron castings from different parts of the country, samples of foundry coke, alloys, pig iron and fluorspar. A 12-cylinder Liberty motor loaned by the Lincoln Motor Co., Detroit, will also be exhibited. Represented by S. W. Hubbard, Cleveland; T. A. Wilson, Pittsburgh; A. O. Sonne, Chicago; H. W. Fernald and F. E. Fitts, Boston; R. W. Clark and J. A. Claussen, New York; George R. Sullivan, Richard Peters, Jr., S. B. Morrison and H. B. Carson, Philadelphia; F. J. Waldo, and A. F. Stengle, Buffalo; F. W. Bauer, A. J. Wentworth, and J. R. Morehead, Cincinnati.

P. H. & F. M. ROOTS CO., CONNERSVILLE, IND.—Small sized blowers and gas pumps. Center of interest will be the first Roots blower ever constructed. This blower is 60 years old.

WILLIAM SELLERS & CO., INC., PHILADELPHIA.—Centrifugal sand mixing machines, belt and motor driven; a universal tool grinding and shaping machine, motor driven, and a twist drill grinding machine, motor driven. To be

List of Exhibitors, Together with the Numbers of Exhibition Spaces Shown on the Plan on the Facing Page

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Dayton Molding Machine Co. .....
Debevoise-Anderson Co. 141-3
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United Compound Co. 219
United States Graphite Co. 142
U. S. Molding Machine Co. 197-9
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H. L. Wadsworth 340
Wadsworth Core Machine & Equip. Co. 176
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T. B. Wood's Sons Co. 69
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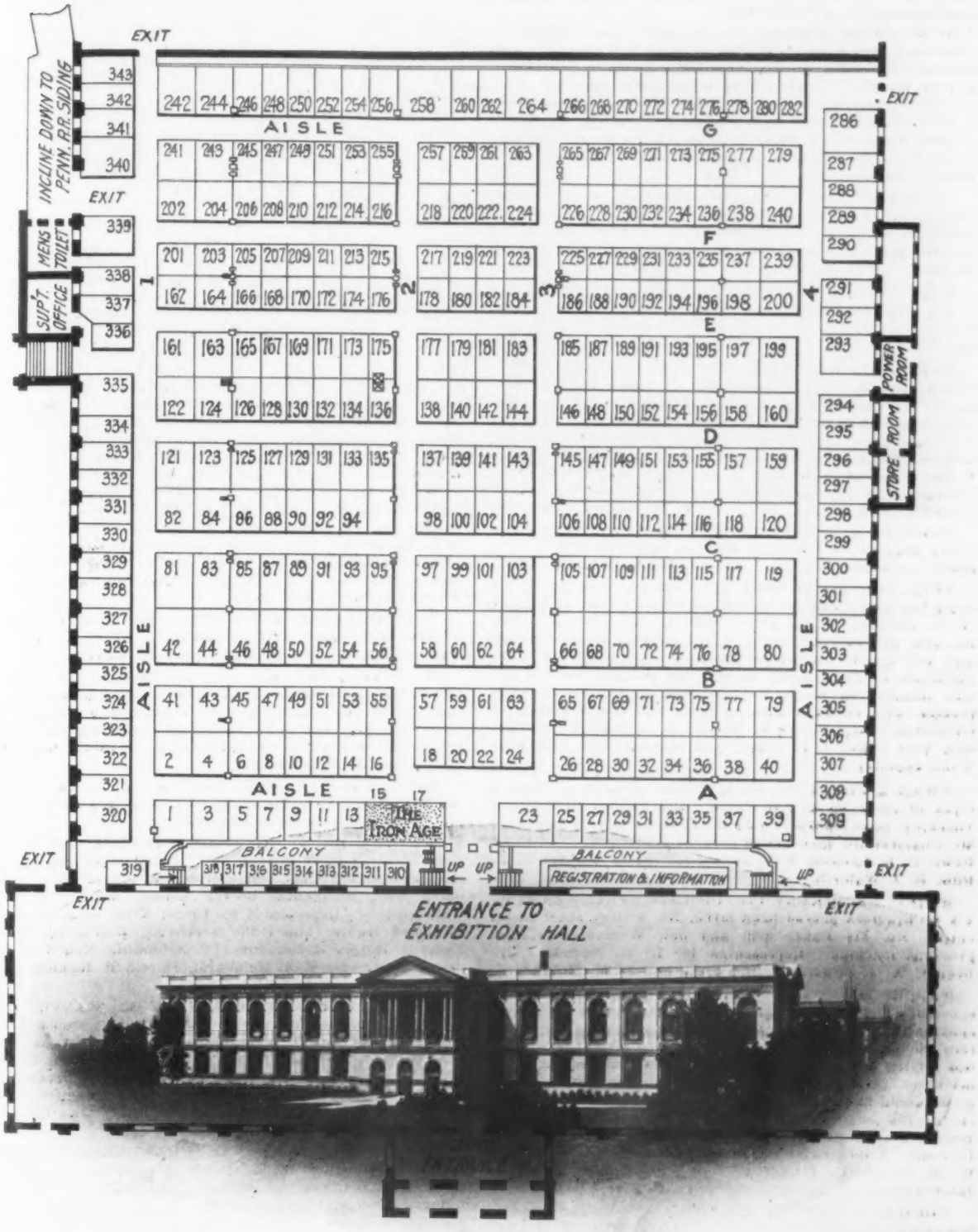


THE PHILADELPHIA COMMERCIAL MUSEUM, WHERE THE EXHIBITION IS BEING HELD

represented by Edward L. Hollijes, Charles T. Wilson, Stephen A. Smith.

SHEPARD ELECTRIC CRANE & HOIST CO., MONTOUR FALLS, N. Y.—Full line of hoisting equipment. A special feature will be a stairway and walkway, so that anyone interested may get close to the machines to make a thorough examination of the working parts. On the floor will be shown an entirely new type of electric cargo winch in operation. Among those who will represent the company are the following: W. C. Briggs, R. W. Hurst, New York; F. E. Meeks, R. J. Wadd, Pittsburgh; N. P. Farrar, D. B. Patterson, Baltimore; H. W. Gledhill, John Jackson, Philadelphia; W. D. Minler, Cleveland; G. N. French, Boston; Walter B. Briggs, Chicago; R. H. McGrady, A. J. Barnes, John Guyer, Montour Falls, N. Y.

SIMONDS MFG. CO., FITCHBURG, MASS.—Complete line of solid and inserted tooth metal-cutting saws, files and hack saw blades. Represented by H. B. McDonald, metal saw specialist; R. D. Baldwin, advertising manager; and Spencer Patterson, Philadelphia representative.

SKINNER BROTHERS MFG. CO., ST. LOUIS.—Baetz heaters, showing operation for heating foundries and all types of industrial plants, without the use of sheet metal distributing warm air ducts. Represented by Edwin C. Evans, chief engineer; C. V. Haynes and J. M. Sewell.

W. W. SLY MFG. CO., CLEVELAND.—Complete sand blast mill, turntable, sand blast cabinet, hand cabinet, sand blast cage for cleaning small parts, complete tumbling mill, resin mill, sand blast pressure tank, a set of sand blast test plates and photographs, including a large picture of a dust arrester connected with air compressor intake. Represented by W. C. Sly, president; George J. Fanner, vice-president; E. J. Moore, mechanical engineer; P. W. Graue, D. E. Hadley and S. H. Baird, Western, Eastern and Central sales representatives.

R. P. SMITH & SONS CO., CHICAGO.—Protec-toe safety

shoes for molders and foundrymen. Exhibit in charge of J. B. Smith, Jr., vice-president.

WERNER G. SMITH CO., CLEVELAND.—Reception booth, and will have on exhibition cores and castings; also samples of Linoil and other core oils. Those in attendance will be Werner G. Smith, general manager; Milton S. Finley, vice-president; Frank H. Dodge, Michigan manager; L. P. Robinson, New England manager; William E. Rayel, service expert; F. K. Sawyer, manager sundry oils department; John C. DeVenne, secretary; Louis F. Ferster, advertising manager.

SPENCER TURBINE CO., HARTFORD, CONN.—Turbo compressor. To be shown for the first time at a foundrymen's exhibition, as it is a comparatively recent production in the foundry field. The company will be represented by H. M. Grossman, sales engineer, and S. E. Phillips, secretary.

STANDARD SAND & MACHINE CO., CLEVELAND.—A Standard core sand mixer, direct motor driven. Represented by Harry E. Boughton, vice-president and general manager.

STERLING WHEELBARROW CO., MILWAUKEE.—Rolled steel flasks, special foundry barrows, wedges, skim gates, trucks and shop boxes. Some extra large flasks, which will be duplicates of flasks furnished to some of the larger automobile concerns, will be shown. Those in attendance will be I. R. Smith, J. M. Dickson, A. E. Welch and H. H. Baker, of Milwaukee; J. J. Coyne, Herman Kalthoff, Chicago; R. F. Jordan, Boston; C. L. Kirk, Pittsburgh; G. H. Lambkin, New York; J. W. Dopp, J. M. Patterson, Detroit.

STRAUSS & BUEGELEISEN, NEW YORK.—Exhibit of safety goggles for industrial workers, equipped with the resistal, non-shatterable lens. Represented by Maurice Malter.

SULLIVAN MACHINERY CO., CHICAGO.—One of its angle compound belt-driven air compressors, size 14 x 8¾ x 10 in. capacity, at 50 r.p.m., 445 cu. ft. per min. This machine will be operated by 75-hp. General Electric motor, and will supply air as at previous expositions for other exhibitors at the foundry show. The Sullivan exhibit will also include one single line single-stage belt-driven compressor, with enclosed working parts and splash system of lubrication. Represented by Arthur E. Blackwood, manager New York office; J. B. Pratt, sales engineer, and Alexander Milne, engineer.

SWAN & FINCH CO., NEW YORK.—Exhibit of various types of cores made with Corul. Represented by Richard Thackray, sales manager; Edward F. Ryan, import manager; Mr. Chamberlain, manager of core oil department; and C. G. Howe, C. B. Lamson, T. P. James, George J. Graham, J. A. Ellis, H. J. Waldron.

SWIND MACHINERY CO., PHILADELPHIA.—An 18 in. x 8 ft. Bradford geared head lathe; No. 1 Gray sheet metal cutter; No. 314 Baker drill and new Worcester internal grinding machine. Represented by L. H. Swind, J. E. Brandt, W. J. Powers, M. R. Carson and D. M. McCracken.

TABOR MFG. CO., PHILADELPHIA.—Plain power squeezers, combination jarring squeezers, power squeezing split pattern molding machines, jarring squeezing split pattern molding machines, shockless jarring machines, shockless jarring and roll-over machines, hand ramming roll-over machines, jarring stripping plate molding machines, Taylor-Newbold saws, Taylor milling cutters. All of these machines will be in operation. Those in attendance will be Wilfred Lewis, president; H. W. Brown, secretary; J. T. Ramsden, chief engineer; J. H. Coleman, H. W. Impey, W. E. Sewell, D. J. Martin, John Fendner, E. S. Lewis, Jacob Degler, Philip Shire and T. L. Sumner.

THOMAS ELEVATOR CO., CHICAGO.—Barker wrenchless chuck and Barker drill vise. Represented by J. R. Cassell, New York, and A. W. Boldebuck.

THOMAS IRON CO., HOKENDAUQUA, PA.—Samples of pig iron, iron ore and castings made from Thomas iron. Represented by Philip E. Wright, Philadelphia sales agent.

LEWIS THOMPSON & CO., PHILADELPHIA.—Practical demonstration showing mahogany as an ideal lumber for making patterns. Represented by Charles H. Thompson, Jr., and L. P. Bransford, Jr.

TRUSCON STEEL CO., YOUNGSTOWN, OHIO.—Truscon pressed steel foundry flasks, pressed steel platform for lift trucks, and photographs and full layouts for all types and sizes of Truscon standard buildings and other Truscon products. Represented by G. F. Danielson, manager pressed steel department; G. F. Bateson, manager sash sales department; C. I. Auten, manager standard buildings department; H. W. Jencks, pressed steel department; G. F. Sparks, pressed steel department; C. W. Glose, standard buildings department.

UNITED COMPOUND CO., BUFFALO.—Buffalo brand core venting and Buffalo brand pattern wax, a substitute for beeswax and bayberry wax. Represented by J. W. Bradley, manager, and L. F. Leney, assistant manager.

UNITED STATES GRAPHITE CO., SAGINAW, MICH.—Various grades of plumbago foundry facings for castings and a general line of graphite products. Represented by R. A. Corrigan, Philadelphia; J. G. Drought, Chicago; F. B. Godard, Pittsburgh; H. F. Gump, Cleveland; G. D. Robinson, Buffalo.

U. S. MOLDING MACHINE CO., CLEVELAND.—Plain air squeeze machine, combination jolt and squeeze machine, combination jolt squeeze pattern draw machine, combination jolt squeeze stripping plate machine, combination jolt stripping machine, jolt roll-over core machine and a plain air jolt machine, all in operation. Represented by J. N. Battenfeld, J. L. Battenfeld, C. F. Battenfeld, and J. L. Murdock.

UNITED STATES SILICA CO., CHICAGO.—Samples of Flint Shot for sand blasting and Flint Silica for steel molding and core making; also samples of castings produced with these materials will be shown. Represented by Volney Foster, Lewis B. Reed, H. F. Goebig, Oliver Cook.

VANDYCK CHURCHILL CO., PHILADELPHIA.—Various machine tools including the products of the American Tool Works Co., Cincinnati; the Kempsmith Mfg. Co., Milwaukee; the International Machine Tool Co., Indianapolis; the Oakley Machine Co., Cincinnati; Higley Machine Co., South Norwalk, Conn., and the Geometric Tool Co., New Haven, Conn. The exhibit will be in charge of C. M. Hammersly, manager Philadelphia office, assisted by Charles F. White, A. C. L. Black, J. K. Robson, George A. Crawshaw, all representing the Vandyck Churchill Co.; J. C. Hussey, H. W. Schatz and F. L. Stubenroth, American Tool Works Co.; Mr. Drewes, Kempsmith Mfg. Co.; J. A. Villard, International Machine Tool Co.; Abbott A. Thayer, Oakley Machine Co.; C. Granger, Higley Machine Co.; C. F. White, Geometric Tool Co.

J. D. WALLACE & CO., CHICAGO.—Complete line of pattern shop equipment. Represented by J. D. Wallace, president; H. L. Ramsay and James F. Stewart.

WARNER & SWASEY CO., CLEVELAND.—In operation on bar work a Universal turret screw machine with all geared head and on chucking work, a Universal hollow haxagon turret lathe. Represented by A. C. Cook, sales manager; L. K. Berry, assistant sales manager; E. R. Gardner, New York manager, and H. E. Yeager.

WESTINGHOUSE ELECTRIC & MFG. CO., EAST PITTSBURGH, PA.—Electrical apparatus used for arc welding; also specialties for foundry use.

WHITE & BROS., INC., PHILADELPHIA.—All descriptions of non-ferrous metals, "CC" brand ingot casting copper, electrolytic copper, composition and bronze ingot, yellow brass ingot, manganese bronze, babbitt metals and other white metals. Represented by Frank Krug, sales manager; Raymond Hunter and Gillis Arsenault, Boston representatives; G. Horace Krider and J. C. Ashmeade, New York representatives; and F. A. Reinhardt, Harold F. Reinhardt and Ray Galbraith.

WHITING FOUNDRY EQUIPMENT CO., HARVEY, ILL.—Operating model of type R crane trolley; round, steel-plate tumbling barrel, turntable with grooved tracks, 2-ton charging car, 2-ton worm-geared crane ladle (new design) and photographs, etc., of foundry equipment. Represented by R. H. Bourne, vice-president and sales manager; A. H. McDougall, consulting engineer; W. R. Hans, sales engineer; R. S. Hammond, sales engineer.

T. B. WOOD'S SONS CO., CHAMBERSBURG, PA.—Equipment for the Wood system of taper snap molding, comprising the Peerless patented tapered snap flask and automatic adjustable patented snap jacket. Flasks and jackets will be shown in various sizes adapted for a wide range of snap work. The operation of the Peerless flask in connection with power squeezer machine will also be demonstrated. Representatives, Charles M. Wood and Victor Lesher.

E. J. WOODISON CO., DETROIT.—Molding machines and a general line of foundry requisites. Represented by E. J. Woodison, president; C. H. Woodison, vice-president; J. C. Woodison, secretary; W. S. Haggman, Seattle manager; W. J. Wark, Buffalo manager; R. W. Davidson, Boston manager; R. S. Hoffman, Cleveland manager; M. A. Bell, St. Louis manager; M. J. Witters, Milwaukee manager; H. T. Taylor, D. D. Baxter, H. Chamberlin, F. J. Shotts, E. Mead, W. M. Burroughs, M. Thomson, F. F. Shortsleeves, Mr. Richardson, M. M. Werckman, salesmen; Geo. A. Burman, manager liquid core compound department; J. F. Webb, manager molding machine department; W. H. Muir, manager facing department.

YOUNG BROTHERS CO., DETROIT.—Rack type core baking oven. A new type of lift rack for cores will also be displayed. Represented by George A. Young, secretary and treasurer; R. B. Reed, sales manager; G. G. Parry, publicity manager; T. P. McVicker, W. C. Wagner, A. H. Ackermann.

The storage yard is equipped with two 5-ton cranes for handling pig iron, scrap, sand, etc.

Efficiency Methods Triple Foundry Output

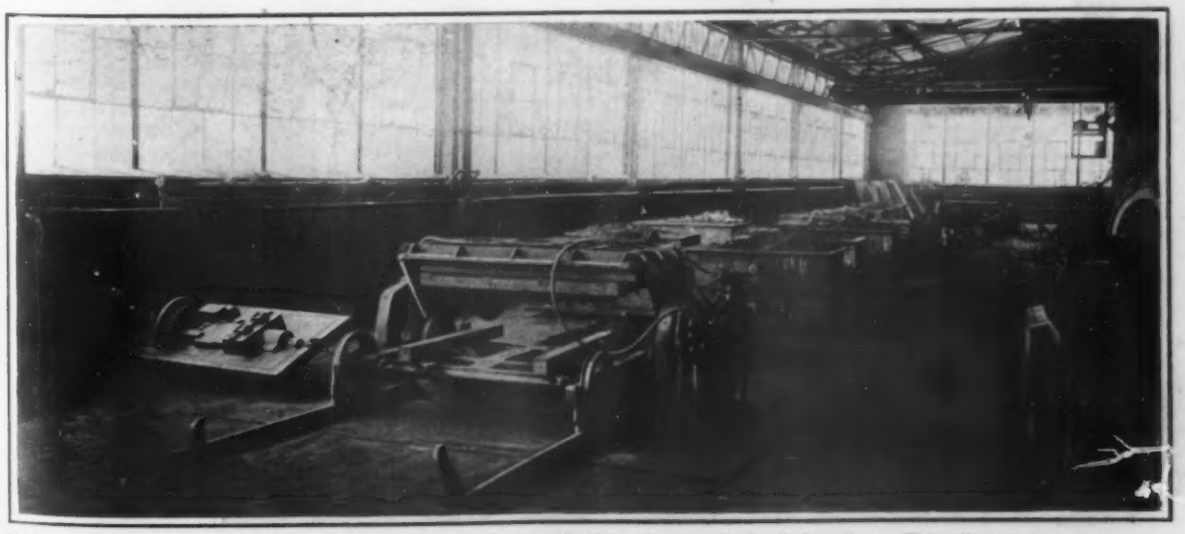
Bullard Machine Tool Co., Bridgeport, Conn., Greatly Increases Production by Bonus Plan— Daily Record Per Man Up From 360 to 1020 Lb.

BY C. E. WRIGHT

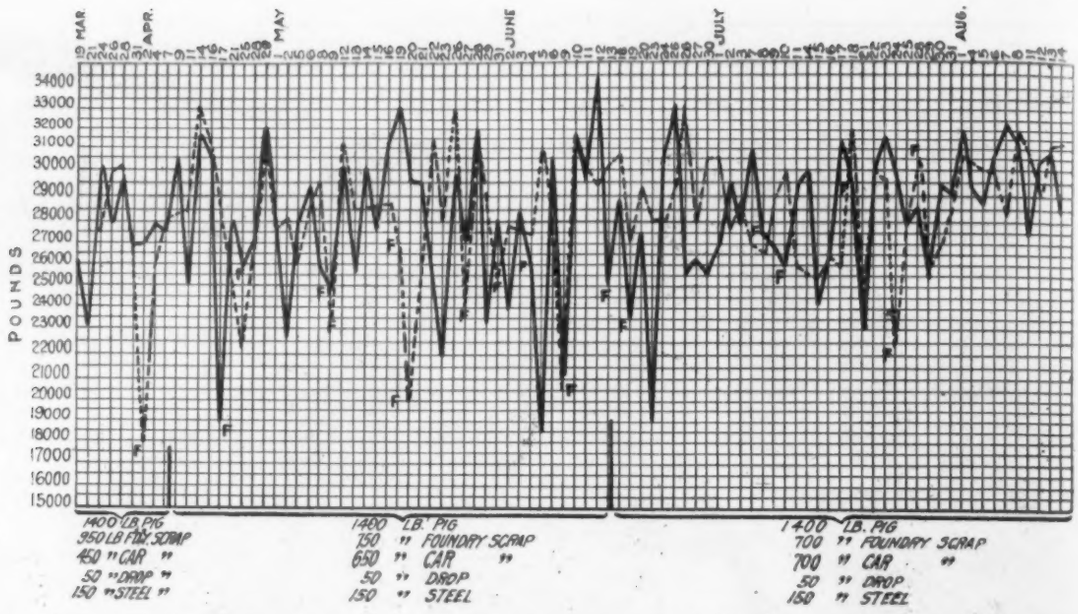
IN THE IRON AGE of June 28, 1917, there appeared a description of the "maxi-pay" wage and productive bonus plan of the Bullard Machine Tool Co., Bridgeport, Conn. Sufficient time has now elapsed since the plan was inaugurated to judge of its success. This article will deal only with the results of the plan in the company's foundry, but in a later article it is hoped to present data showing the effects of the system upon machine-shop production.

The foundry of the Bullard Machine Tool Co. was purchased early in 1917 from the J. A. Taylor Foundry Co., which had been making castings for Bullard machine tools, and the "maxi-pay" plan was shortly afterward put into operation. At the time the foundry was operated by the Taylor company, the average output of castings per man was 340 to 360 lb. daily, while the present daily output averages 1180 lb. per man. It would not be quite true, perhaps, to say that the system itself has increased the output to that extent, but the management gives the plan credit for a good share of the increase, and other efficiency methods which have been introduced from time to time have helped to bring up the average production.

During the first few months of operation by the Bullard Machine Tool Co., but before the "maxi-pay" plan had been introduced, the foundry was turning out about 740 lb. daily per man. Since the plan was inaugurated, however, the average has not fallen below 1020 lb. per man daily, while present output is on the basis of



Modern equipment has done much toward increasing production in the Bullard foundry. This illustration shows the molding machines in a bay of the main foundry.



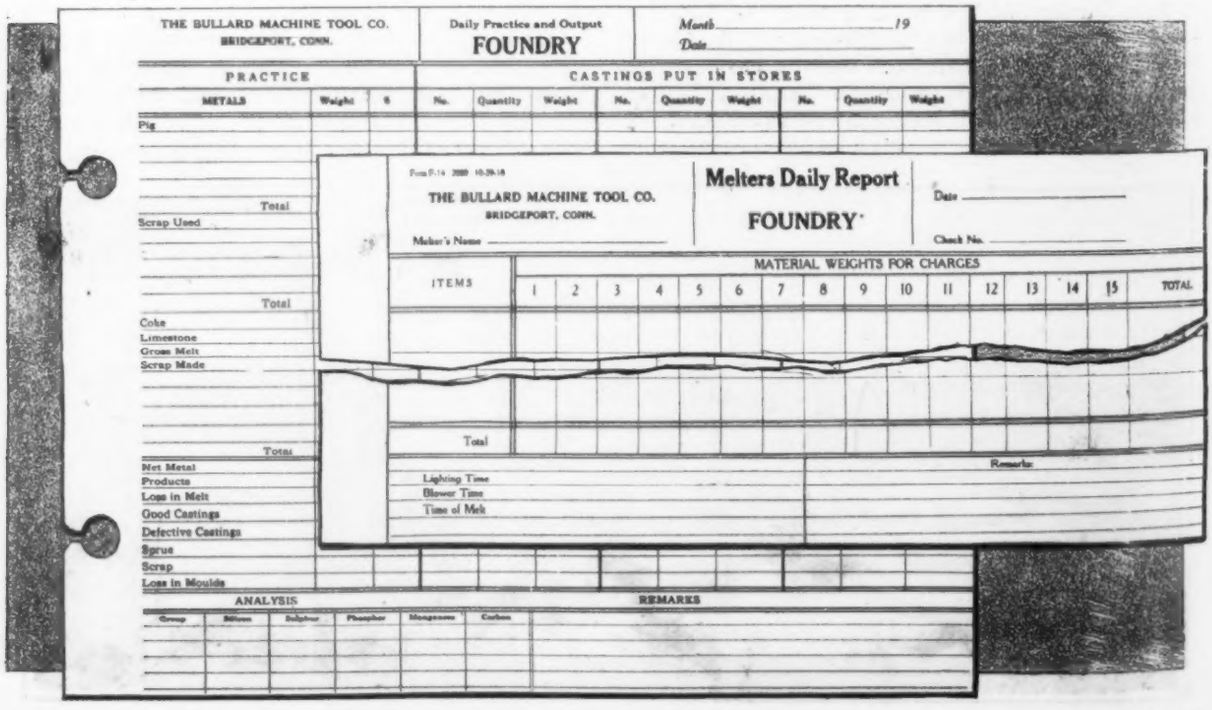
Bullard foundry castings have in nearly all cases surpassed the 21,000 lb. per sq. in. minimum requirements for tensile strength of medium castings of the American Society for Testing Materials. The heavy black line shows the results obtained when the regular mixture was used and the dotted line shows results from the regular mixture plus 0.5 per cent ferrosilicon. The low records, marked F in the chart, indicate flaws in test bar.

1180 lb. per man daily. The highest point that has been reached in any week was 1360 lb. per man, and while this was exceptional, it is not unlikely that it may be reached again under favorable conditions.

The Bullard "maxi-pay" wage and production bonus plan provides for bonus payment for increased production in addition to the hourly class rates. It is in no sense a piece-rate system, as the men are paid the hourly rate whether they become entitled to the production bonus or not. However, a man whose efficiency persistently fell too far below a fair standard of work would not be regarded as a capable workman and his services would eventually be dispensed with. Every opportunity, however, is given a workman in the way of instruction and the personal assistance of his foreman to make good before final judgment is passed.

Under the production bonus plan, a standard time for each operation is first established. The standard time is, in all cases, the time in which the operation can reasonably be accomplished. Standard times remain unchanged for one year from the date when they are established, provided no change is made in designs, method or equipment. Such changes, if made, are as equitable both to the foundryman and the company as it is possible to make them. A standard time, once fixed, remains unchanged unless it develops that it is unjust to the man. Then adjustment is made. The company takes the risk of having the standard established too high, but every opportunity is given in the trial time for establishing an equitable time before the final establishment of a standard time.

On new work, or old work done in new ways or with different equipment, it is not always possible to establish an equitable standard time, with-



A record is maintained of the performances of the cupolas. Daily reports are made which are tabulated for weekly and monthly totals.

From 3000 to 4000 castings are made in the Bullard foundry, and this wide variety of work necessitates a systematic method of stock-keeping so that the calls from the machine shops can be promptly filled. These boxes or bins, with their contents, are transported by industrial truck to a loading platform and placed on a motor truck, which carries them to the machine shops.

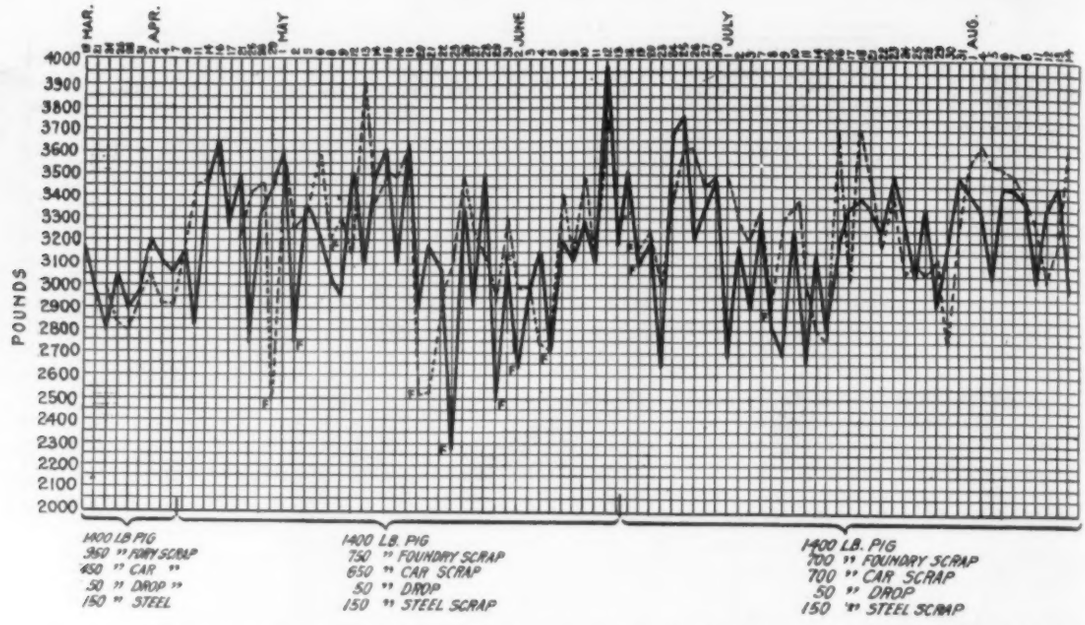
out actual experience as a guide. In such instances a trial time is set, and the operation performed thereunder until it is determined what a fair standard time should be.

Standard times are reckoned as 100 per cent Bonus payments, however, start at 75 per cent. That is, if a man achieves a 76 per cent. record he is surpassing the point of inefficiency by 1 per cent. A production bonus of 1 per cent. of wages is paid for each per cent of efficiency over 75 per cent.

If a man performs his work in standard time he would have an efficiency of 100 per cent, and, therefore, is entitled to and receives a production bonus of 25 per cent. Thus, if a man averaged 100 per cent. throughout the month, and his hourly wage rate was 75 cents, his total wage, including his bonus, would amount to $1 an hour.

It is not to be expected, however, that a workman's efficiency will be the same on one day as on another. His condition of health, the weather or other things may cause him to lose production on some days, while a change from one kind of work to another, with which he is less familiar, is

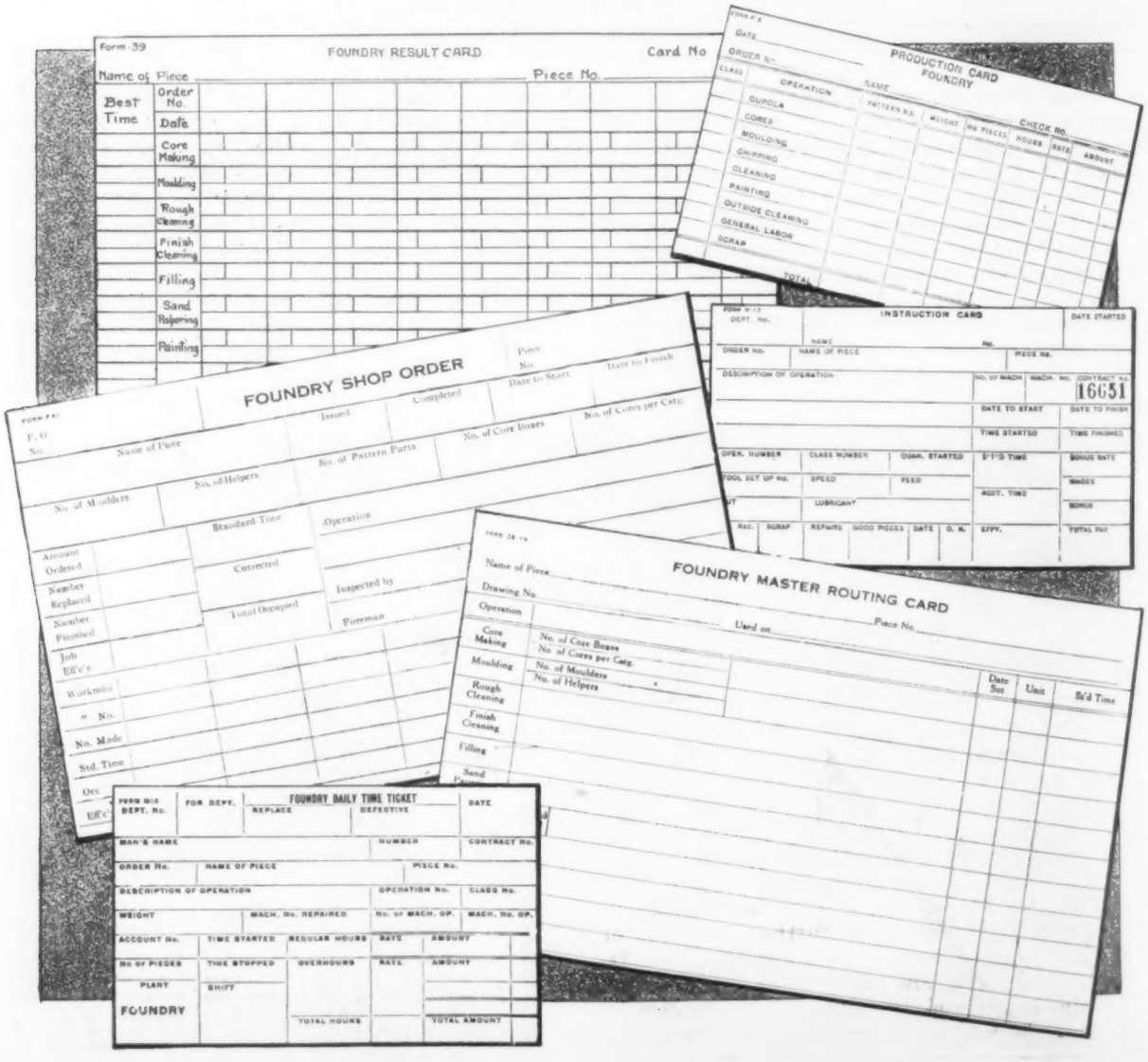
A large, well-lighted pattern shop is a feature of the Bullard foundry.



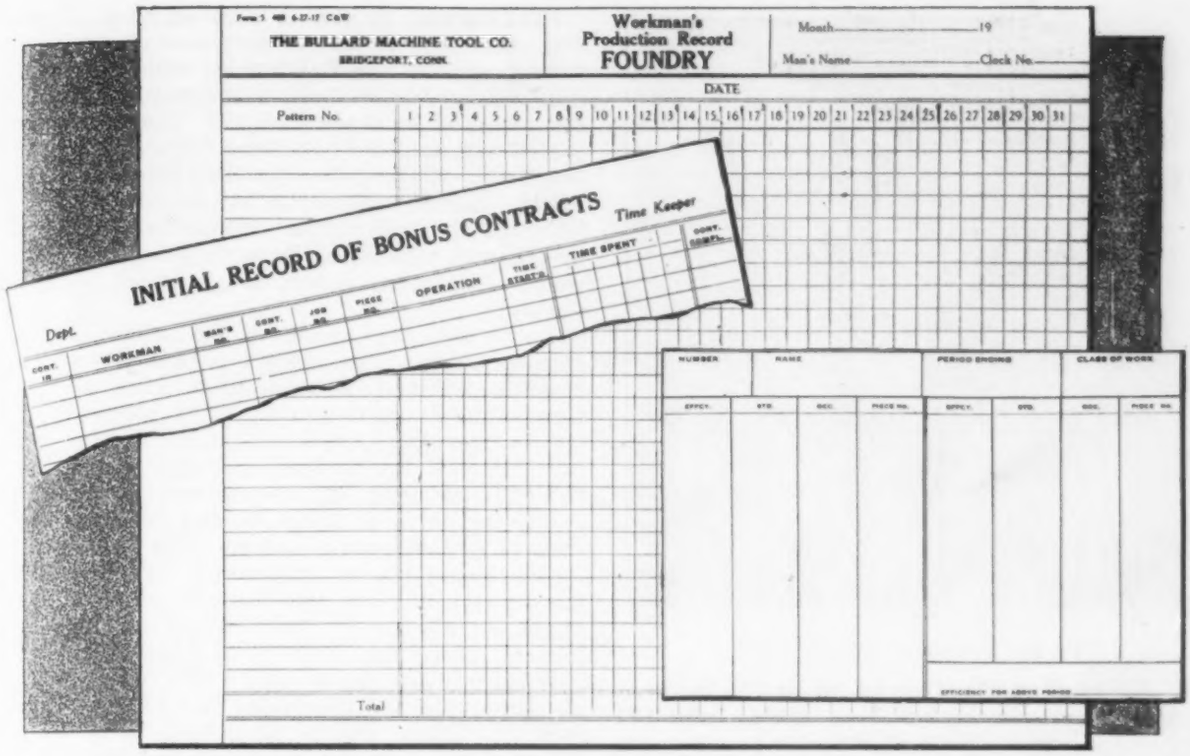
Bullard castings have shown an average of 3200 lb. per sq. in. in the transvese test. The heavy dotted line in the chart shows the results achieved in the use of the regular mixture and the dotted line shows results from the regular mixture plus 0.5 per cent ferrosilicon. The low points in the chart, marked F, indicate flaws in the test bars.

also a contributing factor to loss of production. The fact that the Bullard foundry makes from 3000 to 4000 different castings makes it almost impossible for every man to work continuously on one piece of work that would give him the exceptional speed which comes from constant repetitional work.

An actual record of one workman's efficiency during a month shows that for the first three days he was 93 per cent efficient; on the fourth he



Various Forms Used in the Bullard Foundry to Record Results Under the Standard Time and Production Bonus Plan

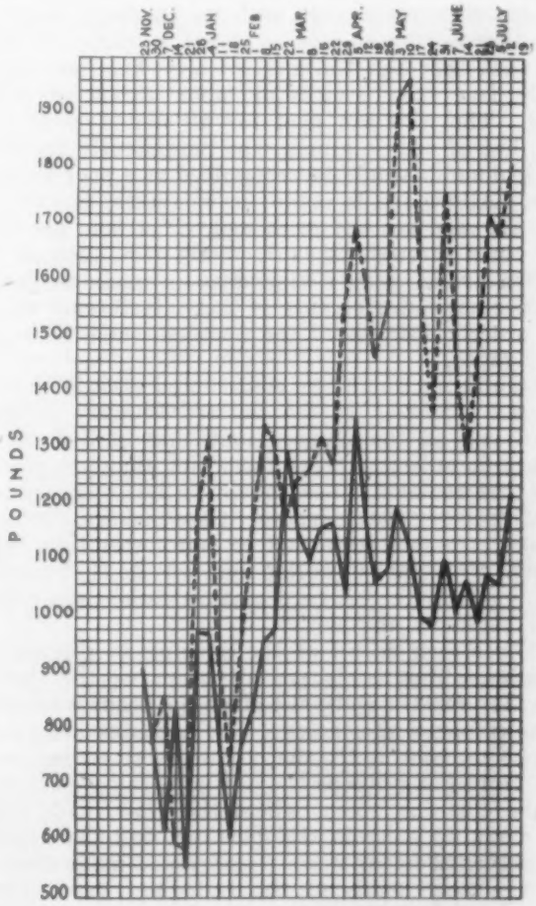


By means of these forms a record is kept of the production of every workman. Not only is a record kept for each individual, but a comparative record is also made showing the time that different workmen require for the same operation.

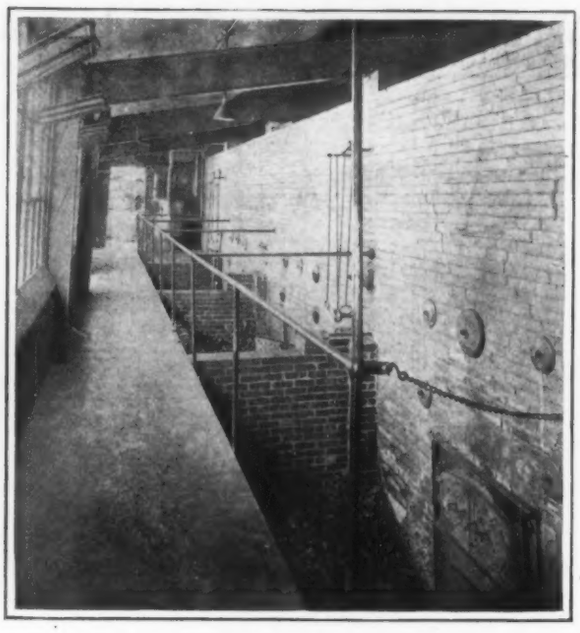
dropped to 89 per cent; then on the fifth day, he went up to 100 per cent; 99 on the sixth; 93 on the seventh; 105 on the eighth, and then his record fluctuated from 80 to 90 for about a week, when suddenly it dropped to 67 per cent. Whenever a man's work falls off that much an investigation is made the following day. In this instance it was found that the workman's low record was due to a change of work. His unfamiliarity with the new work caused the low record. The second day on the new job, however, he gained to 71 per cent; then up to 77 per cent and the following day he achieved a 97 per cent record. For several days thereafter he fluctuated between 85 and 89 per cent.

It is not unusual in the Bullard foundry for a workman to go over 100 per cent. On one day recently a workman had a record of 114 per cent. It seldom goes higher than this, however, as too high a record would show that something was wrong with the standard time which had been set for the job. If such a mistake should be made, as it is occasionally, the men are as quick as the management to see that the trial time should be changed, and this is done without causing any criticism.

To show what has been actually accomplished on different foundry operations in the way of time-saving, it is cited that the bed for a 24-in. vertical turret lathe formerly took 28 hr. to make and now is made in 14 hr., a saving of 14 hr. A part of this saving is due, of course, to new and better equipment which has been installed. The management estimates that possibly one-half to two-thirds is due to equipment and the remainder to increased efficiency among the men. To carry the comparisons further, the bed for a 36-in. vertical turret lathe formerly took from 32 to 34 hr., and now the work is done in 16 hr.; a 42-in. bed, formerly taking 42 hr., is now done in 24 or 26 hr., while the best time made on the bed of a 61-in. boring mill, under the old system, was 56 hr.; now the work is accomplished in 32



The heavy black line in this chart shows the average daily weight of good castings per molder in weekly periods and the dotted line shows the average daily weight of good castings per week per cleaner for weekly periods. Cleaning includes the work of shippers, cleaners and grinders. It will be noted that the molding results have almost tripled, while results in cleaning have almost quadrupled during the period illustrated by the chart.



The fire pit back of the core ovens.

hr. On small castings, up to 100 or 125 lb., even greater improvement has been noted, fully 100 per cent increase in production having been brought about, but this is partially due to the installation of molding machines.

The men recognize that the company intends to be fair with them in all matters, and this attitude of the employers with its thorough understanding by the men is no doubt responsible for the fact that the Bullard foundry has been entirely free from strikes or labor unrest of any kind. The men are paid for all molds, good or bad, but of course a man who persistently turned out bad molds would be recognized as a poor workman. Allowance is made for mistakes, however, and the men are not penalized. If a man should lose time, through no fault of his own, such as a broken crane, proper allowance is made so that he does not suffer because of that interference with the orderly progress of the work on which he may be engaged.

One thing which has contributed greatly to increased efficiency in the Bullard foundry is the insistence of the management that skilled men should do only that work for which they are paid, and that common labor should be left entirely to men hired for that purpose. Core makers, for instance, are not permitted to put cores into the ovens. There are unskilled men who do that work, and the minute the core makers finish one core they begin on another.

Three men do all of the pouring in the main foundry. The molds are all prepared for them and they remain and pour after the other workers have prepared the molds. The castings are permitted to cool until the night gang comes on. The night gang dumps the castings, removes them to the cleaning room, where they are ready for the cleaning gang in the morning, and the flasks are returned to the main foundry and made ready for the new molds of the following day. The night men clean up the foundry and put it in good shape for the day gang. Thus, there is no pick-up work for the day men to do. Everything is in readiness for them, and they can start at work immediately when the gong rings in the morning.

This saving of all skilled men from doing work that is in the nature of common labor has also been a very important factor in increasing the production of the Bullard foundry.

The time of the men is saved in every possible way. Drinking fountains are placed at every convenient spot in the building so that a workman is not obliged to walk from one end of the foundry to the other to get a drink. These fountains are of the sanitary type and have proved very beneficial. Electric fans are also placed throughout the foundry so that on hot days better circulation of air is provided. Shower baths are used by the men when they have finished their day's work. Also metal lockers are provided for their clothes.

In metallurgical processes, the Bullard foundry department has also worked toward the highest possible efficiency. Its castings in nearly all cases surpass the 21,000 lb. per sq. in. requirements for tensile strength of the American Society for Testing Materials for medium castings. Aside from defective castings, its average has been 28,000 lb. per sq. in. and 33,000 lb. and over has been reached in numerous instances. The specification for the transverse test in medium castings is 2900 lb. per sq. in., but the Bullard castings have shown an average of 3200 lb. per sq. in. The highest record was 3960 lb. and the lowest was 2650 lb., but with the exception of a few instances all records for the transverse test have exceeded 3000 lb. These results have been achieved by watchfulness over the mixtures and by careful laboratory tests. A recent addition to the foundry is an experimental cupola with a capacity of about 1000 lb. hourly, and whenever new mixtures are attempted they are first tried out in this experimental cupola and the castings are given thorough laboratory tests before the process is passed upon as proper for general work.

The mixture which has lately proved most efficacious for the castings which are used in Bullard machine tools is made up as follows: Three kinds of pig iron amounting to 50 per cent of the charge, and ranging in silicon from 1.75 to 3.25 per cent, resulting in a mixture of 2.15 per cent silicon; forge flashings, 5 per cent; machinery cast scrap, 45 per cent. For small castings a sufficient amount of ferrosilicon is added in the mixing ladle to bring the silicon contents of the mixture up about 0.20 or 0.25 per cent.

The foundry equipment consists of two main cupolas and the experimental cupola, the former

Steel shelves equipped with ladders to reach the topmost tiers are provided to store the three or four thousand patterns used in the foundry.

being of 70 and 30 tons capacity; four large coke-fired core ovens and four small core ovens, and modern equipment for molding, ramming, cleaning, sand-blasting, etc. Ramming is all done by compressed air. The main foundry is served by two 10-ton overhead cranes, 10 electric job cranes in the main bay, a 3-ton crane in the core room and three 3-ton cranes in the side bays. The storage yard is served by two 5-ton cranes. At present all sand is conveyed into the foundry by wheelbarrow, but a contemplated improvement is an underground tunnel by which it may be carted and mixed below the foundry floor and then lifted through an open pit by cranes.

In its relation to the main plant of the Bullard Machine Tool Co. the foundry has one drawback, it being located about three miles from the machine shops, but this will be overcome as the machine shops will soon be moved into a new building adjoining the foundry.

Silico-Manganese for Steel Castings

Experiences of American Foundrymen in the Use of One Alloy Instead of Two — Advantages and Disadvantages

BY E. F. CONE

THE advantages or disadvantages of the use of silico-manganese, or alloys of silicon and manganese, in place of a combination of ferromanganese and ferrosilicon in steel foundry practice have been discussed in recent months by various papers and at meetings of technical societies. Opinions for and against have been expressed.

The practice came into prominence virtually as a war measure, or suggestion at least, in order to conserve manganese. That is, by using such an alloy it might be possible to utilize certain native manganese ores high in silica which could not easily be used to make either ferromanganese or spiegeleisen. Besides this it was contended that the advantages derived from its use were important both economically and metallurgically.

Realizing the importance of this subject to steel foundrymen and also knowing that in certain foundries such alloys had been used or were still in use, THE IRON AGE sent to over 100 representative American foundries, open-hearth, converter and electric, a circular letter containing seven questions. This list of questions is printed as an insert on this page. Replies were received from over 60 per cent of the companies approached. Of these, 56 foundries reported that they had never used any such alloy, having confined themselves to the addition separately of ferromanganese and ferrosilicon while eight steel casting makers gave their experience in the use of certain alloys of manganese and silicon. The principal points in the various replies are here abstracted.

The Questions Submitted

1. Have you at any time, as the result of the war or other conditions, used silico-manganese or similar alloys instead of ferromanganese and ferrosilicon for introducing manganese and silicon into steel castings?
2. If so, what was the composition of the alloy or alloys you used?
3. Did you find it necessary to supplement the silico-manganese with other alloys to attain the desired manganese and silicon contents in the steel?
4. How was the addition of silico-manganese made—bath or ladle—and was the steel acid or basic, open-hearth, converter or electric?
5. What can you report as to the advantages or disadvantages of using such an alloy in place of two separate alloys?
6. What composition as to silicon and manganese would you recommend as best adapted to acid or basic practice?
7. Is there any advantage in cost?

A large foundry making acid open-hearth castings made the following reply to the seven questions:

1. Silico-manganese.
2. Silicon 24 per cent and manganese 50 per cent.
3. Added 0.08 per cent manganese as 80 per cent ferromanganese to the ladle.
4. Of the silico-manganese 75 per cent was added to the furnace (the coarse material) and 25 per cent added to the ladle (fine material).
5. The advantages over the use of two separate alloys is two-fold. First, in the time saved, and second, we feel that it is somewhat easier to make good steel in the acid furnace by the use of this alloy. The reason for this is that the simultaneous addition of the silicon and manganese in the intimate mixture act upon the FeO in the steel in the actual presence of each other and form a true fluid slag of iron-manganese silicate. This more readily separates from the steel than either sonmims of SiO_2 or MnO_2 formed by the additions of ferrosilicon first and completing the reaction of FeO removal with ferromanganese.
6. In acid practice 20 per cent silicon and 55 per cent manganese would be ideal, as it would do away with the ladle addition of manganese.
7. The use of silico-manganese results in higher cost, figured at 1918 prices, than either 10 per cent or 50 per cent ferrosilicon and 80 per cent ferromanganese.

Another large maker of both acid and basic open-hearth castings gives the following testimony:

We have recently made a few heats using a silico-manganese alloy of the following composition: Silicon, 25.32 per cent; manganese, 51.37 per cent.

The composition of two of the heats made with this alloy was as follows:

Heat No.	Carbon, Per Cent	Manganese, Per Cent	Silicon, Per Cent	Phosphorus, Per Cent	Sulphur, Per Cent
1.	0.20	0.52	0.23	0.042	0.043
2.	0.21	0.51	0.29	0.031	0.043

It will be noted that the manganese is rather low, and, unless we can get a higher ratio of manganese to

the silicon content of the alloy, we would have to use supplemental manganese.

We crushed the alloy and added it to the metal as it was flowing through the furnace spout. We obtained very excellent physical results from the tested coupons, but nothing remarkable. The heats in question were run in an acid furnace.

As based upon the relative prices of silico-manganese and the two alloys in separate forms, the use of the former is rather more expensive. I do not believe there is enough additional value in the double alloy, from a metallurgical standpoint, to warrant any additional expense. Theoretically, we should have a cleaner steel, everything else being equal, through the use of silico-manganese on account of the more fusible manganese silicate slag formed. However, in my opinion, we should look further back than the final additions to insure a metal which will be practically free from injurious inclusions.

Another steel foundry making acid open-hearth and converter steel castings offers the following report:

1. Used some silico-manganese in spring of 1915 but only in an experimental way.

2. The composition was about 70 per cent manganese and 25 per cent silicon.

3 and 4. We had to supplement this alloy with 80 per cent ferromanganese in the open-hearth heats using 100 lb. of 80 per cent ferromanganese and 250 lb. of silico-manganese for a 10-ton heat, the additions being made to the ladle. The finished steel for castings analyzed: Carbon, 0.17; manganese, 0.75 and silicon, 0.25 per cent. For a 12-ton heat 300 lb. of silico-manganese was used in the ladle and 25 lb. ferromanganese through the furnace. The steel analyzed: Carbon, 0.12; manganese, 0.60; phosphorus, 0.37; silicon, 0.31 and sulphur, 0.043 per cent. In the converter 30 lb. silico-manganese to the ton gave a steel analyzing: Carbon, 0.08; manganese, 0.61 and silicon, 0.34 while the regular practice of adding 25 lb. of 80 per cent ferromanganese and 15 lb. of 50 per cent ferrosilicon gave: Carbon, 0.14, manganese, 0.26 and silicon, 0.36 per cent. The additions were thrown into the converter as soon as it was turned down on drop of the flame.

5. The total additions are less when using silico-manganese making a saving in the labor of handling, weighing and storing. Also if lower carbon is desired it is easier to secure this by the use of such an alloy. The reverse is true if a higher carbon is desired by the use of the final additions alone.

6. For acid open-hearth steel for castings, if the alloy contains 25 per cent silicon, it is only necessary to use twice as much as when the 50 per cent alloy is used with the use of extra ferromanganese to secure the desired manganese content.

7. We have no figures on the cost.

A producer of converted castings offers the following account of his experience in using silico-manganese alloys:

As to the use of alloys of silicon and manganese, or silico-manganese, in the manufacture of steel castings, we beg to advise as follows, taking your questions in sequence:

1. Yes.

2. Manganese, 20 per cent; silicon, 5 per cent. Also one of manganese 22 per cent and silicon 9 per cent.

3. Yes.

4. The silico-manganese was melted in the cupola and added to the ladle for acid converter steel.

5. We have not made enough such steel to be able to give any comparative results between the use of silico-manganese and separate alloys of silicon and manganese for steel castings. We believe, however, that it is advantageous to add the silicon in the liquid state, together with the manganese, to the steel as the silicon is distributed better throughout the bath.

The testimony from a large maker of steel and malleable castings is as follows:

We do not use silico-manganese in any amount, but we do believe it is a most valuable alloy where a definite relation between silicon and manganese is to be maintained. In our case we have to vary the relation between the silicon and the manganese content, and we can do this more conveniently by using different amounts of ferromanganese, spiegeleisen and ferrosilicon. As you doubtless know, the carbon content figures more prominently than the other elements and, with a full knowledge of the single unit ferroalloys, a definite percentage of carbon can be predetermined, together with the desired relation between the silicon and the manganese. This calculation would be far more difficult and confusing by the use of silico-manganese alloys, where the carbon content is apt to be variable. As we said before, however, silico-manganese is a very valuable alloy and the best possible alloy for some manufacturers to use, but in our particular case we prefer to use the separate alloys. In our experiments the silico-manganese that worked the best showed 10 to 12 per cent of silicon and about 20 per cent manganese.

The opinion on this subject of a producer of important castings made to meet severe Government specifications is as follows:

This plant has not used silico-manganese or similar alloys as a substitute for ferromanganese and ferrosilicon.

While for certain purposes we would have used silico-manganese alloys in lieu of ferrosilicon no advantage was seen in the substitution in that the price usually quoted on silico-manganese is very little different from the price of the pure alloys, particularly if electric ferrosilicon were utilized.

This plant would not recommend the use of silico-manganese to any extent, in basic open-hearth or acid open-hearth practice, as there is considerable advantage in adding the silicon and manganese at different times, although a small amount of silico-manganese could be used in making up the last of the final additions in the open-hearth furnace. This material could be utilized with entire satisfaction in cupola or converter practices, provided the analysis of the alloy runs uniform.

The principal reason we have not gone into the use of silico-manganese has been that, when the cost of iron, manganese and silicon contained in the silico-manganese was compared with the cost of the same ingredients in the form of ferroalloys, the financial advantage was not sufficient to warrant the use of silico-manganese as a substitute.

The only electric steel casting company which reported any experience of the nature under discussion offered the following testimony:

During the war the requirements of No. 3 cast steel for the Government necessitated a high manganese content. We got this by the use of spiegeleisen. We also achieved this result at times by the use of manganese steel scrap. The ferrosilicon we used contained about 50 per cent silicon although we got a good deal of silicon into the steel by changing silica in the slag to silicon in the metal.

When we did not get enough manganese from our spiegeleisen, we added 80 per cent ferromanganese, and when we did not get enough silicon from our slag we added 50 per cent ferrosilicon.

All alloys of whatever kind were added in the bath as we are making acid electric steel.

We do not like an alloy of silico-manganese. There are times when one needs silicon and no manganese, and there are times when one needs manganese and no silicon and, while there are times when you need both silicon and manganese, by our process such an alloy is not a convenient one to use.

An analysis of our casting would show 0.30 to 0.40 per cent silicon, although a series of tests was run which indicated that up to 0.75 per cent was not detrimental in steel, even in the raw state or annealed. Our manganese runs from 0.40 to 0.60 per cent, but during the war we made a steel almost exclusively that contained 0.30 per cent silicon and 1.25 per cent manganese, hence

our rather unusual practice. This steel was used for No. 3 castings.

Of course our practice of introducing silicon and manganese into the steel is based on getting the lowest possible cost and it naturally follows that in making No. 3 steel with 1.25 per cent manganese, the cost of this steel was higher than making steel with 0.40 to 0.60 per cent manganese in it.

A producer on a large scale of basic open-hearth castings replied that he had never used silico-manganese but had heard that other companies had used it with good results and with some saving in costs. It was also stated that the company does not like to make a change in its practice and hence had not experimented with these alloys.

A large open-hearth steel foundry has sent in the following experience which is somewhat out of the ordinary:

We have not used any silico-manganese since the beginning of the war nor up to the present time. We did use, however, a spiegeleisen which ran about one to 1.50 per cent silicon and 13 to 17 per cent manganese. This material was in the same shape as 11 per cent ferrosilicon and the addition was made through the bath. We, of course, had to make up the difference between the above analysis and that desired by further additions of ferromanganese and 11 per cent ferrosilicon.

The foregoing testimony is not extensive and it is evident that the use of such alloys has not been widespread. There has been no uniformity from this evidence as to just what alloy as to composition is preferable. Two of the companies that have given their experience testified that an alloy of about 20 per cent silicon and 50 to 55 per cent manganese not only gave good results but was regarded as ideal. This composition also agrees with an authority quoted later on.

It is apparent from the replies received that there is a decided reluctance on the part of most producers to adopt or even experiment with any practice which is a departure from old established methods, unless especially necessary. Even the assurance that possibly better castings might result has not been a potent factor in most cases.

The two most important recent contributions to this subject were a paper, "Manganese Alloys in Open-Hearth Practice" by Prof. S. L. Hoyt, presented before the February meeting this year of the American Institute of Mining and Metallurgical Engineers (THE IRON AGE, May 22, 1919) and "Silico-Manganese from Electric Furnaces" by B. G. Klugh, read at the spring meeting of the American Electrochemical Society (THE IRON AGE, Aug. 14, 1919.)

A resumé of the observations of Professor Hoyt, which gives a very clear idea of the use of silico-manganese alloys, is as follows:

The average amount of manganese remaining in the steel, using ferromanganese and ferrosilicon, was 80.9 per cent, while the average using silico-manganese was 91.3 per cent.

The same results as to manganese and silicon content of the finished steel can be obtained by using silico-manganese with smaller amounts of manganese and silicon, as compared to using the combination of ferromanganese and ferrosilicon.

There is the advantage of having a more uniform practice, which in itself would warrant smaller additions.

The low carbon content of the silico-manganese alloys may or may not be a material advantage but it is in favor of the single alloy addition, because the carbon need not be worked as low, and there seems to be less danger of missing the carbon.

The indication of the results obtained in actual practice is that silicon protects the manganese in oxidized heats.

The manganese-silicon alloy would appear, in making steel castings, to have the distinct advantage of making cleaner and sounder castings.

These contentions speak for themselves. There is no doubt that theoretically there are decided advantages in the adoption of a standard manganese-silicon alloy for making steel castings. Just what the proportions should be is a question. One of 53 per cent manganese and 20 per cent silicon has proved very advantageous according to one authority. To be successful it would be necessary to obtain a commercial alloy that would introduce from 0.25 to 0.35 per cent silicon and from 0.60 to 0.80 per cent manganese in the average steel casting, acid or basic. For basic practice it might be necessary to use a higher silicon content than for acid heats. The consensus of scientific opinion is that a better metal, one quieter and freer from inclusions, would result from the use of one alloy instead of two.

Uranium in Ordnance Steel

During February, 1917, the question of the value of uranium in steel for the liners of cannon became more pressing, says a pamphlet of the U. S. Bureau of Mines, "War Work and the Bureau of Mines." According to rumors from abroad the Germans were using uranium steel in some of their special guns. After some preliminary discussion a conference was called at the Watertown Arsenal March 24, 1917, between Dr. H. W. Gillett, alloy chemist of the bureau, and officials appointed by the arsenal. On March 27 the director of the Bureau of Mines received from the commanding officer of the arsenal a letter stating the determination of the influence of uranium on gun erosion was a matter that warranted thorough investigation. Accordingly work was begun at Ithaca by Dr. Gillett under the direction of C. L. Parsons, chief chemist of the bureau.

On April 12, 1917, the commanding officer of the Watertown Arsenal requested the director of the Bureau of Mines to extend the investigation to molybdenum and tungsten steels. In the early fall of 1917, J. G. Thompson and Louis S. Deitz, Jr., were inducted into the service, assigned to the Bureau of Mines, and later commissioned as second lieutenants to assist in this work. On July 17, 1918, E. O. Denzler was inducted into the chemical warfare service and assigned to the alloy steel work at Ithaca.

As a result of the work done at Ithaca a large number of uranium and tungsten steels were prepared and submitted to the Watertown Arsenal. Because of delay in testing, samples were reshipped to the Bureau of Standards for investigation of their physical and chemical properties. Tests were not completed when the armistice was signed.

The Wheatland plant of the Shenango Iron & Steel Co., at Wheatland, Pa., which was purchased some years ago by Max Soloman, a scrap iron dealer of Pittsburgh, and which has been idle for the last 11 years, has been sold to the New Process Iron & Steel Co., of Noblestown, Ind. The plant is to be dismantled and the machinery, equipment and buildings removed. Mr. Soloman retains the water lines, car plant and sidings on the Pennsylvania and Erie railroads.

An all-steel Truscon standard building, built by the Truscon Steel Co., Youngstown, Ohio, was recently delivered to the General Motors Corporation, Milwaukee, Wis., plant, transported on two motor trucks. The building was 24 x 80 ft., and weighed six tons.

Dwight P. Robinson & Co., Inc., constructing and consulting engineer, New York, is building the eight-mill sheet plant at Niles, Ohio, for the Falcon Steel Co., promoted by Lloyd Booth and Paul Wick, Youngstown, Ohio.

Automatic Wide Wheel Grinder

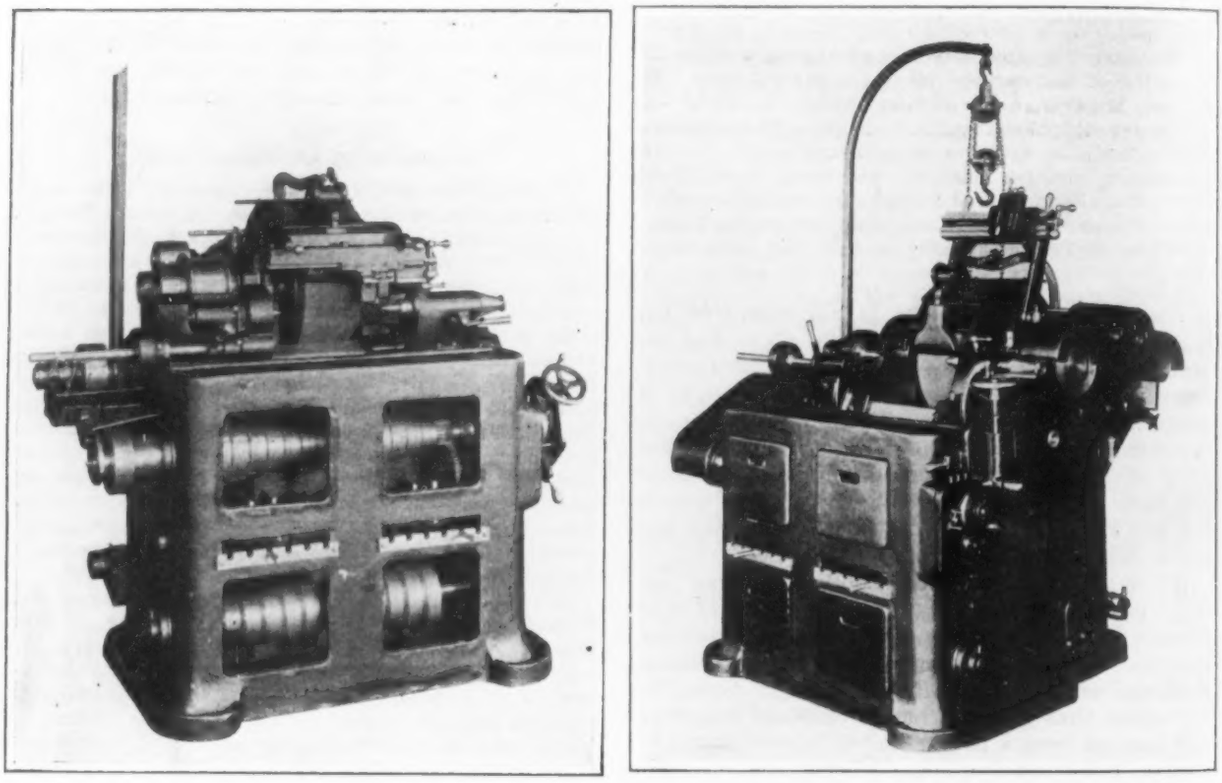
A plain grinding machine of a new type shown in accompanying illustrations is a product of the Woods Engineering Co., Alliance, Ohio, and is known as an automatic wide wheel grinder. The operator is only required to load and unload the work, which has a straight in and out movement, with a slight movement lengthwise during the grinding period. The maximum size of the grinding wheel is 8-in. face by 20-in. diameter and the centers take work 1 in. long by 10 in. diameter. The machine occupies a floor space of 6 by 6 ft. and weighs 6000 lb.

There is a departure in the manner of the cross feed movement. Instead of the regulation dovetail or V slide, this is accomplished by a rocking motion. The head and tail stocks are movable on a square shaft, the shaft having journals at the ends which operate in pedestal type bearings, care being taken to exclude all dirt and grit. Clamped to this shaft is an arm which carries the mechanism for making the diameter adjustments in grinding. This arm is shown at the right side of the machine in the illustration, the 6-in. hand wheel standing in a convenient position for the operator. A shaft running through the housing parallel with the square shaft carries on the right hand end a cam that controls the movement of the arm connected to the square shaft and governs the movement of the work to the grinding wheel. This cam shaft has six speeds, ranging from three revolutions in 1 min. to one revolution in 3 min. One revolution of the cam equals a completed job.

In operating the machine this cam shaft is kept running continuously, which sets the pace for the operator, or if it is necessary the trip can be set to trip the feed at the completion of each job, or the feed can be tripped by the operator at any time during the revolution of the cam. At the left-hand end of the cam shaft is a cam that controls the clutch pulley driving the work. These two cams are timed with each other so that when the work moves up to the grinding wheel the clutch pulley is engaged and the work starts rotating just before the work comes in contact with the grinding wheel. When the grinding cycle is completed and the work moves away from the wheel, it stops rotating and comes back to a position for reloading. The six work speeds are obtained by a set of cone pulleys inside the base of the machine. The speed changes for both the work and cam shaft are made by handles projecting through the front of the machine.

The grinding wheel is mounted on the spindle between the bearings and is driven by two 4-in. belts from a motor mounted on the base of the grinding wheel head. This head swivels on a central stud for grinding taper work. The grinding wheels are carried on wheel centers and in changing wheels it is not necessary to break the adjustments of the spindle bearings or to remove any pulleys. The wheel centers have a bore large enough to pass over all other parts on the spindle.

For truing the grinding wheel a frame is pivoted on the casting which forms the wheel guard. The frame carries a dovetail slide arranged to swivel, and a carriage with a cross feed movement carries the diamond holders. The machine is equipped with a crane for handling the spindle when changing wheels.



The Cross Feed Movement Is Accomplished by a Rocking Motion on This Automatic Wide Wheel Grinder. For truing, a frame is pivoted on the casting which forms the wheel guard. A crane is provided for handling the spindle when changing wheels

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The Bureau of Standards, Washington, has issued an advance announcement of the publication of a scientific paper by R. L. Sanford and William B. Kouwenhoven on "The Location of Flaws in Rifle Barrel Steel by Magnetic Analysis." By means of an apparatus especially constructed for the purpose a large number of bars were explored for magnetic uniformity along their length. The results obtained demonstrated that the method is amply sensitive to detect and locate flaws. Further study is necessary to determine to what degree the sensitivity of the apparatus should be reduced in order not to cause the rejection of material which is satisfactory for all practical purposes. For this reason the work is being continued by the Winchester Repeating Arms Co., co-operating in the investigation, and at whose plant the apparatus has been installed.

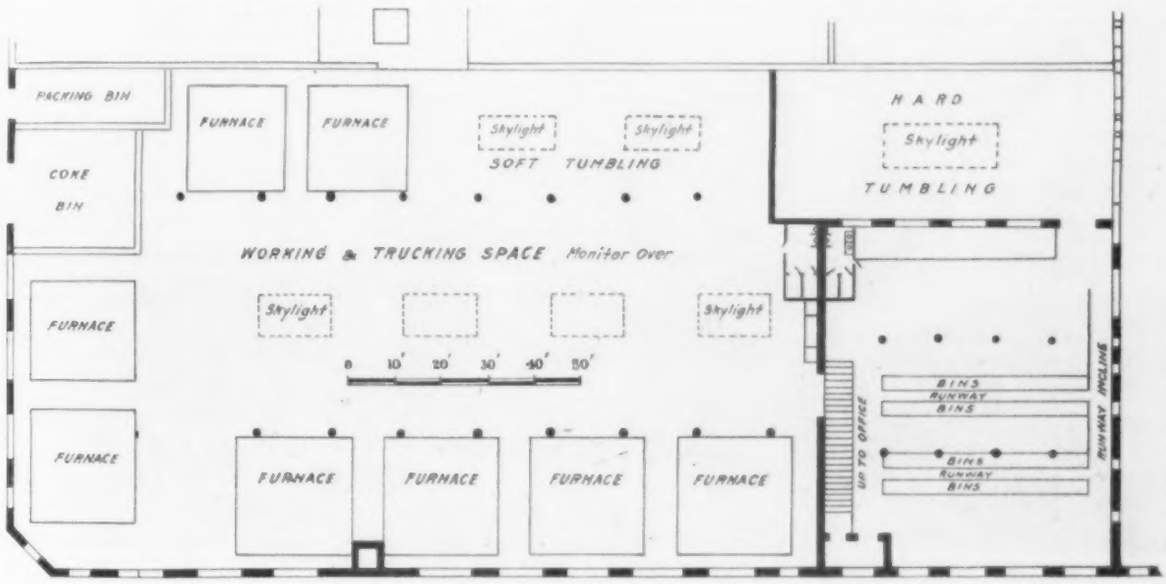
Puddle mills of the A. M. Byers Co., Pittsburgh, at Girard, Ohio, went on five heats per turn instead of four heats starting Sept. 15. The furnaces operate three turns a day.

Economies in a Malleable Iron Foundry

Oppressive Temperatures Eliminated—Concreted Yard—Liberal Storage Provision—Five-Day Operating Schedule

BY A. F. CONANT

IDEAL working conditions have been provided in the annealing department of the Rhode Island Malleable Iron Works, Hills Grove, R. I., by constructing the building with an unusually high roof. The centerline distance from floor to bottom of roof truss of 27 ft. 6 in., or to roof peak of 35 ft. 6 in., serves to provide for the flow of heat far above the heads of the workmen. The absence of debilitating temperatures near the floor acts to insure a maximum physical effort about the furnaces even during the heat of mid-day. This department, 94 x 153 ft., comprises the greater part of a brick and steel structure, 94 x 211 ft., housing in addition both the hard and soft tumbling equipment and the inspection department; it is also liberally provided with steel sash to give flood lighting and free ventilation.



Plan of the Annealing Department, Showing Arrangement of the Furnaces with Liberal Working Space

The annealing furnaces comprise 8 units, 12 x 20 x 6½ ft. inside dimensions, annealing from 18 to 22 tons of castings a day. They are fired on the side with two fire boxes on each side. Charging is by a Foundry Equipment Co. steam truck with a capacity of 3 tons. Three checks are kept on the temperature control: (1) Base metal couple employing the Pyod system with portable pyrometer which can be plugged in on the circuit at any of the furnaces (used whenever any irregular condition is indicated); (2) the "tapalog" or Wilson-Maeulen graphical recorder located in the chemical and metallurgical laboratory, (3) the standard indicator mounted on the wall of the annealing room. All leads for these circuits are carried in pipe conduit. The absence of any loose wiring and the high roof together afforded the company favorable insurance rating. Fire doors are also employed to isolate the room.

Attention to details has been a keynote in the management of operations at the plant and has resulted in a number of economies, all contributing to noteworthy production records on castings weighing on an average from a fraction of one ounce to 25 lb. The output comprises principally pipe fittings, line materials for insulating work, wrench parts, castings for pipe cutters, automobile parts, agricultural implement parts, and general machinery castings.

Because of the small size of the castings routine heavy-handling work is limited principally to the loading and unloading of raw materials in the yard. All such work is accomplished with an Erie locomotive crane carrying a 1-ton grab bucket. The cars of coal, coke and pig iron are switched into position adjacent to their separate open stock piles and unloaded by the crane, from 200 tons of coal or 150 tons of coke being a days work. Pig iron is hand-loaded into the grab bucket at a rate of about 2 tons per hr.

Ample room is accorded for storage in the yard, and space for 3500 tons of coal is provided to take care of a full barge load of 3200 tons, which railroad tie-ups or embargoes at times make it necessary to handle. The coke stock pile will hold 1000 tons, very nearly a year's supply. The capacity for pig-iron storage is 3000 to 4000 tons, and of scrap about 400 tons. To speed up unloading, an incline or ramp parallel to the yard siding and made of earth compacted between 18-in. concrete walls 14 ft. apart and about 120 ft. long, enables the craneman to bring the crane about 5 ft. above the yard, so that he can watch the contents of the cars while unloading.

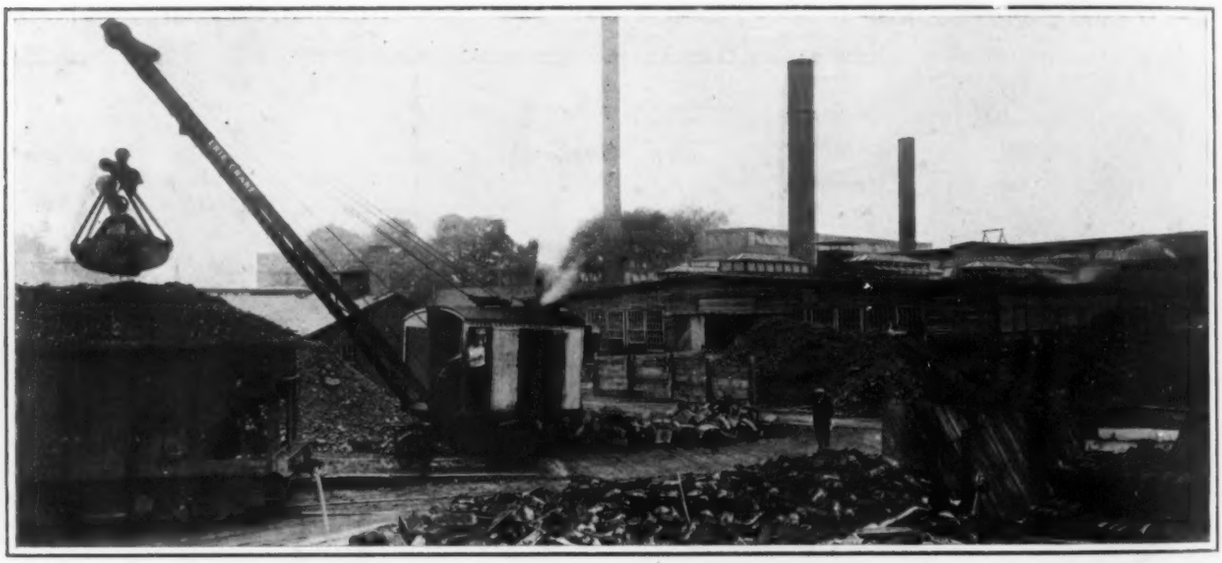
Great economy has been effected by concreting the entire yard to a depth of 6 or 8 in., except beneath the stock piles. The low-cost operation of the locomotive crane, motor trucks and the gasoline tractor which hauls materials from stock

into the foundries on narrow-gage tracks, is largely due to this concreting. As a result the yard gang has been reduced in three years from 25 or 30 men on full shift to 5 to 8 men who finish yard work about 3.30 p. m. and put in the remaining 1½ hr. shifting weights in the foundry for the molders.

At one side of the yard is located a frame building 15 x 215 ft., two stories, for the storage of molding sand, sand-blast sand, fire-clay, furnace lining, fire-brick, lumber, core and machine oils and miscellaneous supplies. It is served by a special railroad siding, which allows for unloading several cars at one time. These materials are customarily unloaded by shovel or by hand, and reloaded in the same way on a 5-ton motor truck which does all the miscellaneous heavy yard hauling.

Cluttering up of the yard with waste materials is avoided by means of a concreted pit, 30 ft. square and 10 ft. deep, into which all slag, spoiled core sand, dirt, etc., is dumped. Every two weeks this is loaded by the crane into a 5-ton Pierce-Arrow motor truck, equipped with dump body, and is hauled away.

Core sand supply is derived from the company's own bank about 1 mile from the plant, to



Materials Are Stored Conveniently for Quick Unloading by a Crane and Grab Bucket. Provision Being Made for Supplies Far in Excess of Immediate Requirements, making Plant Operation Independent of Transportation Troubles

which it is transported by truck and dumped directly into a storage cellar at one end of the core department. Before freezing weather sets in about 5 months' supply is brought in, enough to hold over the winter, and in this way the nuisance of frozen core sand is done away with. A motor-driven chain bucket conveyor elevates the sand to the mixer.

The small size of most of the castings calls for very fine core work, which has led the company to employ on work of this class girls and young women, because of their inherent quickness and dexterity. For this reason the core shop, a high roofed wooden structure, 40 x 163 ft., is arranged informally in two departments, one side containing benches for the females, and the other for the men whose work is confined to the larger and heavier pieces. The center of the room is occupied by racks for storage of baked cores. The benches range alongside the windows which are continuous on both sides, giving free ventilation during the heat of the summer.

The core ovens are segregated in a separate room at the end of the building adjacent to the foundry, avoiding any uncomfortable temperatures in the core department, which in addition to the many windows is ventilated its entire length by a turret roof.

The main foundry building, 80 x 260 ft., of brick, has a level, solid floor of brick set on edge. This has been found effective in cutting down the amount of molding sand and scrap used, the level floor permitting the practice of butting the molds together with jackets removed, so reducing to a minimum the number of jackets needed.

The melt is made in a standard type air furnace of 17 tons capacity, which is charged through the furnace roof by lifting six bungs over the hearth. No cupola equipment is employed. The capacity of the daily melt is 35 tons. The daily cast per molder varies from 150 lb. to 3500 lb., averaging 450 lb.

Storage for bottom boards and jackets or flasks has been provided beside the foundry building, the stacking being arranged according to sizes, so as to facilitate the assembling of proper pieces, save time and prevent useless waste of lumber for building new parts that cannot be readily picked out of an unsorted assemblage.

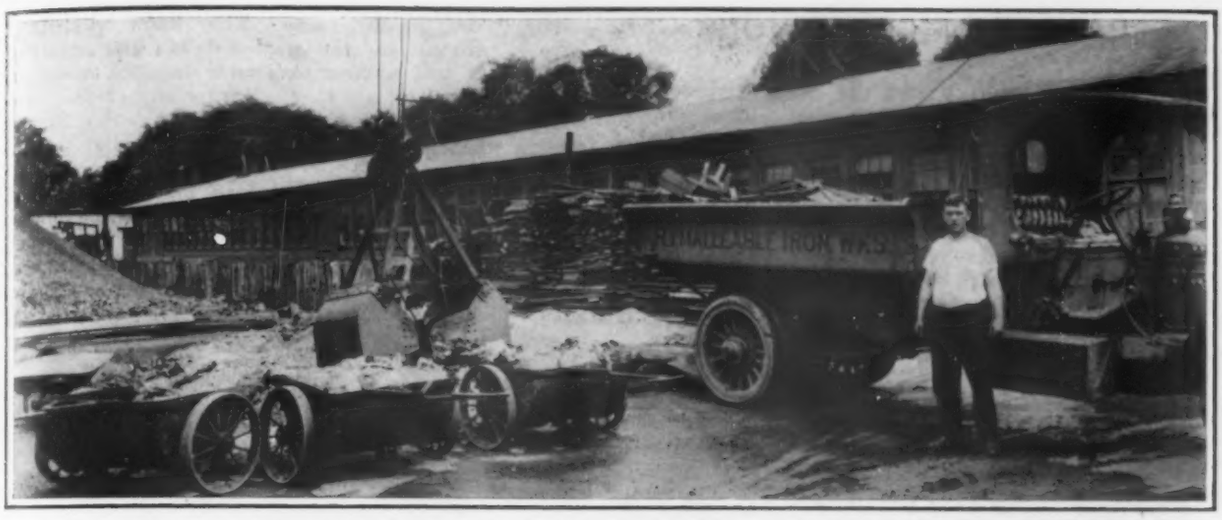
The hard castings are cleaned in a battery of 10 Sly tumblers and are then wheeled up an incline and dumped in bins in the inspection department adjacent to the annealing department.

The tumbling of the annealed castings is by a battery of 10 Sly tumblers, one New Haven sand blast and one Sly rattler, installed at one side of the annealing room, from which they are wheeled into the stockroom preparatory to requisition by the shipping department.

In the pickling room the company has adopted as standard for the body of wheelbarrows and the bottom of barrels construction of 1½ in. hard pine, their experience being that this outlasts the usual sheet metal type several times over.

The pattern shop, match room, carpenter shop and rigging department are contained in a frame building, 34 x 157 ft., to the rear of the core shop. Mechanical equipment includes 2 woodworking lathes, one 16-in. x 3-ft. Cisco metal-working lathe, one 16-in. x 5-ft. Reed-Prentice lathe, 1 No. ½ Van Norman miller, 1 planer, 2 Reed-Prentice drill presses, 1 disk grinder, 1 wood buffer and 1 band-saw.

The ability to maintain a high standard of production is attributed to a large extent by the



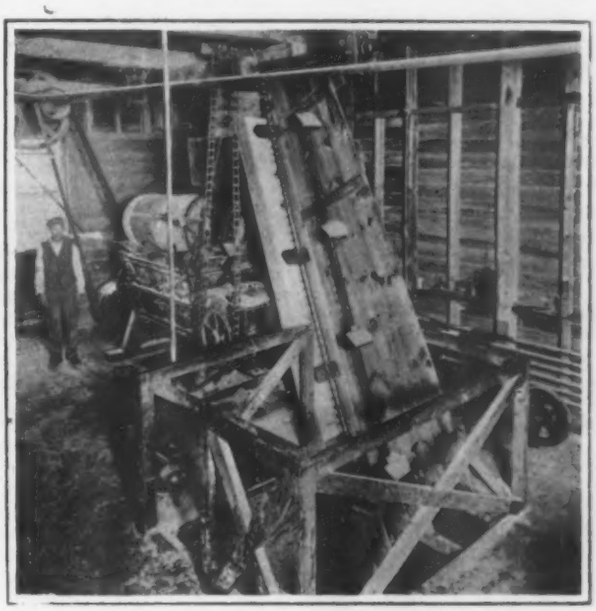
Loading Refuse from Dump Pit into Truck for Hauling Away. Barrows at Left Are About to Be Emptied into Pit

management to its policy of employing only non-union labor and paying a piece-work scale which nets industrious workers considerably more than union wages. Molds are mostly machine-made and are paid for at a rate of from 3½ cents to 50 cents apiece, which brings in about $7.50 a day as against $6 on the union basis. All core work is also on a piece-work rate, the women earning $3 to $6 a day, the men $4 to $6 a day.

Whenever unusual losses are discovered, a careful investigation is made to locate the underlying fault; and caution is taken that no worker shall be reprimanded for carelessness or bad workmanship primarily due to another. The actual delinquent is then coached in detail to eliminate defective work.

A careful daily record is kept of the percentages of broken and of bad castings, and a graphical plotting of these figures serves as an infallible warning to the superintendent of incipient trouble at some stage of production. A roster of all employees, on which the gatekeeper makes a cross opposite the name for each worker present and a dash for each one absent gives a periodic check on attendance and acts as a guide to the management in welfare and home-service work, which has hitherto successfully eliminated unionistic tendencies among its 200 workers.

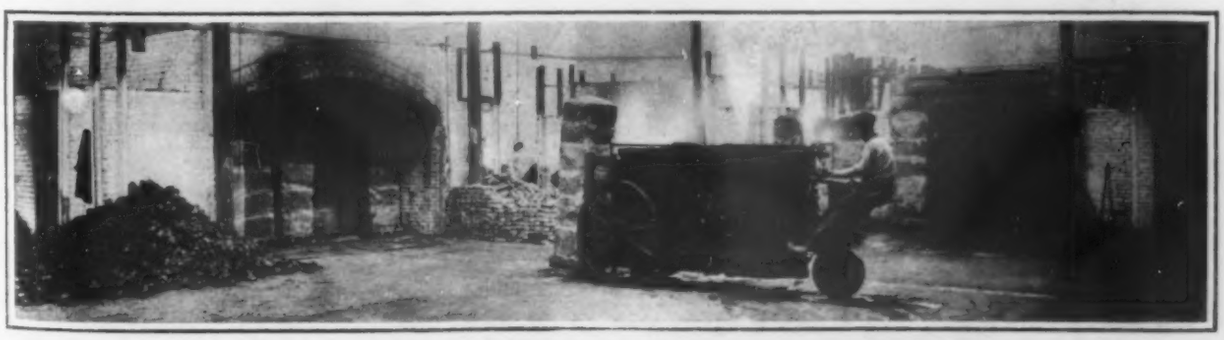
Foremen are trained to treat the men under them with respect, especially in speaking to them. The superintendent undertakes personally to settle any differences between foreman and workers that otherwise would make for disgruntled workmen. This yields high production per capita.



The Core Sand, From Frost-Proof Storage Cellar, Is Deposited by Chain and Bucket Hoist Into Hopper Feeding Core-Sand Mixer

So long as the manufacturing schedule permits, operations are for a 50-hr. working week of 5 days, the plant being closed down on Saturday. It has been found that many workers, either consciously or unconsciously, come to work on Saturday either to get their pay or preliminary to the avocations of a half holiday, and for that reason fail to attain a profitable rate of output. When necessary it is planned to employ, wherever practicable, half the force a full day on alternate Saturdays.

The officials of the company are Charles Brown, president and general manager; H. L. Steeves, vice-president and assistant general manager; M. M. Marcus, vice-president, superintendent and metallurgical engineer; John H. Dickinson, treasurer and assistant superintendent, and E. E. Grinnell, secretary.



Charging Oven by Means of a 3-ton Foundry Equipment Co. Steam Truck

CANADIAN CONDITIONS

How the Dominion Views the Steel Strike—Interesting Facts About Plates

TORONTO, Sept. 22.—The strike in the steel mills of the United States is of considerable concern to many Canadian manufacturers, especially those that make use of plates and tubes to a large extent. The situation is not serious regarding sheets, bars, shapes, etc., as there is enough capacity in the Canadian mills to take care of the volume of business that is offering. In passing, it might be mentioned that there are several of the largest boiler shops in the Dominion that have work on hand that will run well into the winter, and they are in the market now with specifications for new orders. As the plate for each new job goes to the mills by itself, a stock of this material is of little use, unless for standard sizes. Just now there is a good sized marine business being placed chiefly on Great Lakes yards, at Three Rivers and at the Vickers Works in Montreal, and a lot of plate will be needed.

The Price of Plate

For a long time past, Canadian business has been passing at the base price of 2.65c. Pittsburgh, but evidences are not lacking that Canadian firms, if they are keen enough buyers, are getting at least $3 per ton better than this. For instance, one American mill came forward with a proposition at Ottawa, that were all government departments to combine their plate purchasing programs, and make up a worth-while tonnage, the mill would make a 2.50c. price for the business, which would run into large figures. Here is another instance that came to notice this week: A Toronto warehouse, that has also an important connection in the East, made out a nice warehouse order, in all several hundred tons, and forwarded it to one of the United States mills with which it had done considerable business. The Canadian firm stated that if the mill cared to put the business through at 2.50c. it could go ahead; if not, the papers could be returned. So far there has been no return, although there has been sufficient time. On the other hand, some firms—in fact the large majority of them—are adhering to the 2.65c. price, and will not depart from it.

The British Trade

British goods are not coming into the Canadian market with any freedom. Dealers, who for years have confined themselves to old country cutlery, tool steel, etc., are in many cases at the point where they will have to turn to other sources for supplies if they are to keep going. Then again English firms have shown in several cases that they will not depart from their customs in regard to making bids. One shipbuilding concern had contracts for several steel vessels, and forwarded specifications for chain and anchor to the representative of an old country firm in Toronto. This was forwarded, with the specific instructions that there should be a bid per pound for chain and the same for anchor. In due course, word came from the English firm, with a lump bid for the whole thing, stating that this had been its method of doing business in the past, and could see no good reason in this instance for departing from its practice. An American firm put in a bid, as requested, and secured the work.

The Machine-Tool Field

Dealers find that many of the firms that are coming to Canada from the United States, or establishing branches here, have a marked preference for United States equipment, especially in precision tools. Generally the shop executives are men from United States shops, and they have prejudices that are going to assert themselves when it comes to naming the equipment. Canadian machinery houses are finding out also that they must give more service to buyers than ever before. Now that the automobile industry is becoming a large factor here, many shops are taking contracts for making parts. They know what they have to turn out and the price they can get, and they expect to be told whether they need standard or special machinery, and all about it. Hardly any of the Canadian houses carry engineering staffs, but the time is coming when they must if they desire to cater to this trade.

There are developments taking place in many of the industrial centers just now, especially in Ontario at such cities as Hamilton, Toronto, Brantford, Kitchener, as well as Walkerville and adjacent territory. These are keeping machine-tool salesmen busy to see that nothing gets away from them. Real business is being placed, and buying is good.

There is a tendency to shade prices considerably on small tools, such as cutters, drills, taps, reamers, etc. In fact, so frequent are some of the discounts altered that it is difficult to give a real list that would cover the whole field fairly.

Frank Samuel Makes Statement Regarding Ferromanganese

Frank Samuel, Harrison Building, Philadelphia, American agent for the Linthorpe-Dinsdale Smelting Co. of England, maker of ferromanganese, has issued a statement in answer to the complaint of American producers of ferromanganese, recently filed with the Federal Trade Commission in Washington. Mr. Samuel says that he makes all quotations in this country by cable advice direct from his principals, without consulting any other American agent, or without any knowledge of what other agents are quoting. The statement says further:

At the commencement of the war, we individually, as agents, had on our books for deliveries over extended periods, in the neighborhood of 20,000 tons of ferromanganese. In the face of greatly advancing prices, we delivered to our customers all ferromanganese sold at under $100 a ton. During this period we did not sell any ferromanganese under contract at over $200 a ton, and at the end of the war we canceled for our customers over 10,000 tons of undelivered ferromanganese, reducing the price in a number of cases to meet the market conditions.

During the period of the war, when the American makers could arrange prices to suit themselves, and when there was no British competition, the price advanced to $500 a ton; the makers made large contracts with the buyers at prices ranging from $200 to $400 per ton. After the war was over, it is our belief they insisted that every pound of ferromanganese thus purchased during the war and undelivered, should be taken, even though the war was over, thereby making large profits. These same makers are to-day making formal complaint as to the present prices.

The price of ferromanganese has undoubtedly been brought down to a reasonable figure by competition of the English makers and by natural business conditions.

The Pennsylvania Engineering Works, New Castle, Pa., builder of blast-furnace and steel-plant construction, machine and plate work and iron and steel cars, is taking advantage of a lull in its trade to add about 15,000 sq. ft. to its foundry buildings. It is erecting a 30,000-gal. water tower and tank, and adding some miscellaneous foundry equipment. The company is building for stock one 1300-ton mixer and two 25-ton converters.

The Hartford Laboratory Co., 112 High Street, Hartford, Conn., will change its name Oct. 1 to the Laboratories of Charles L. W. Pettee. There will be no change in the organization, methods or management. Mr. Pettee, who has been engaged in commercial analytical chemistry for 22 years, will continue in charge. The mail address will continue to be Post Office Drawer 9, the High Street address being for express and freight.

The Parry Mfg. Co. and the Martin Truck & Body Corporation, York, Pa., have been dissolved and a new company formed—the Martin-Parry Corporation, with F. M. Small, president. The new company is a consolidation of the two old corporations and will continue to build automobile commercial bodies.

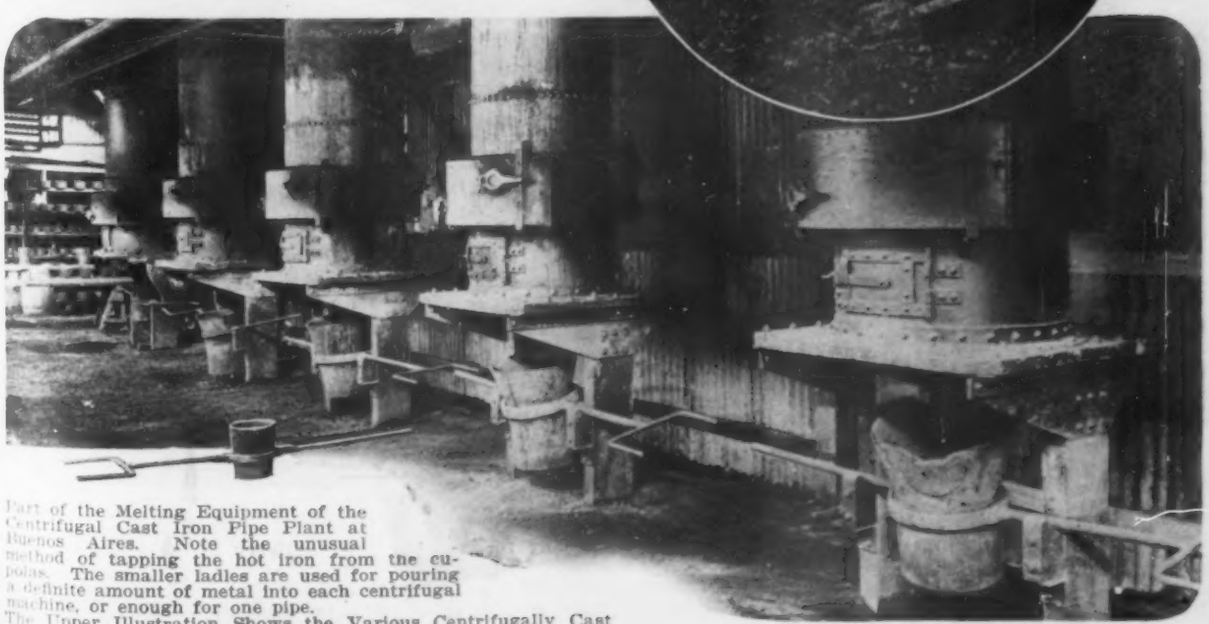
Centrifugally Cast Pipe in South America

New Plants in Brazil and the Argentine Using the DeLavaud Process for Iron Pipe — A Battery of Twenty Machines — Unusual Cupolas

PROGRESS in the application of the centrifugal process for making cast-iron castings has been rapid in the last year or two. The first description of this principle, as applied to cast-iron pipe, apeared in THE IRON AGE Sept. 7, 1916, when the De Lavaud machine was described and reference was made to the commercial use of the process in Brazil.

This new development in cast-iron metallurgy involves the use of a very rapidly revolving metal mold into which is mechanically introduced, while still revolving, very hot molten iron of proper composition. Almost immediately a completely finished pipe is removed from the machine, which is distinguished for its uniform thickness, for its unusual strength in proportion to its cross section, and for the rather remarkable properties of the metal.

Since the description referred to there have been two other accounts of the developments of this



Part of the Melting Equipment of the Centrifugal Cast Iron Pipe Plant at Buenos Aires. Note the unusual method of tapping the hot iron from the cupolas. The smaller ladles are used for pouring a definite amount of metal into each centrifugal machine, or enough for one pipe.
The Upper Illustration Shows the Various Centrifugally Cast Pipe in the Yard of the Brazilian Plant. The hydraulic testing machine is at the right

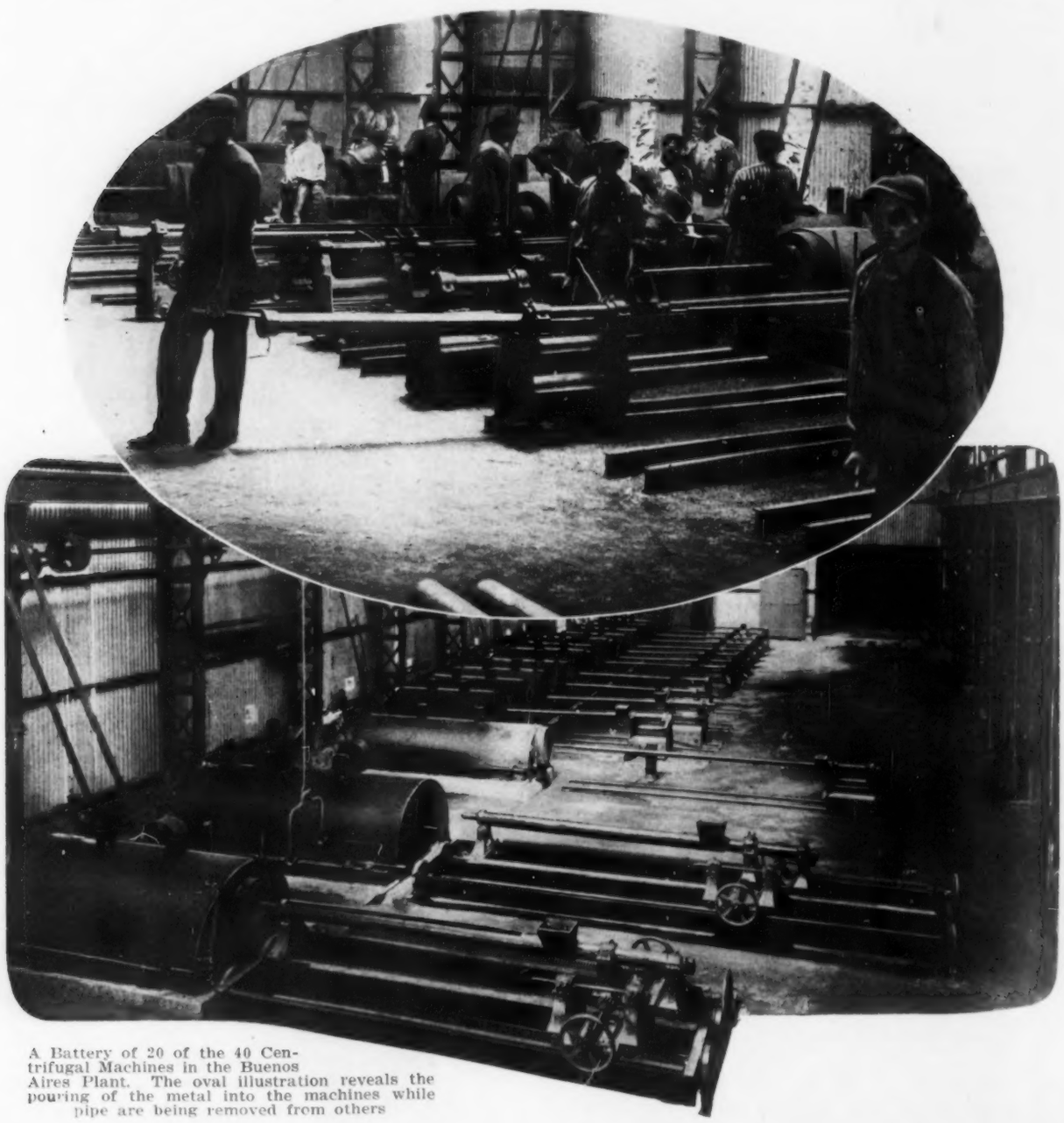
process, which was invented by a Brazilian, D. Sensaud de Lavaud of Sao Paulo, Brazil. In THE IRON AGE of Nov. 29, 1917, there was published a short description of a new plant, using a further development of this machine, the National Iron Works, Ltd., at Toronto, Canada. At that time, 6-in. pipe 10 ft. long was being successfully produced at the rate of 20 to 25 per hour. Since then, however, the process has been extensively developed, so that results far exceeding these have been achieved.

A more recent application of the De Lavaud principle has been the manufacture of cast-iron piston rings in a special machine. This was described in detail in THE IRON AGE, Oct. 3, 1918. According to that description it was possible to produce 18,000 to 20,000 piston rings per day, rings that possessed unusual mechanical and physical properties.

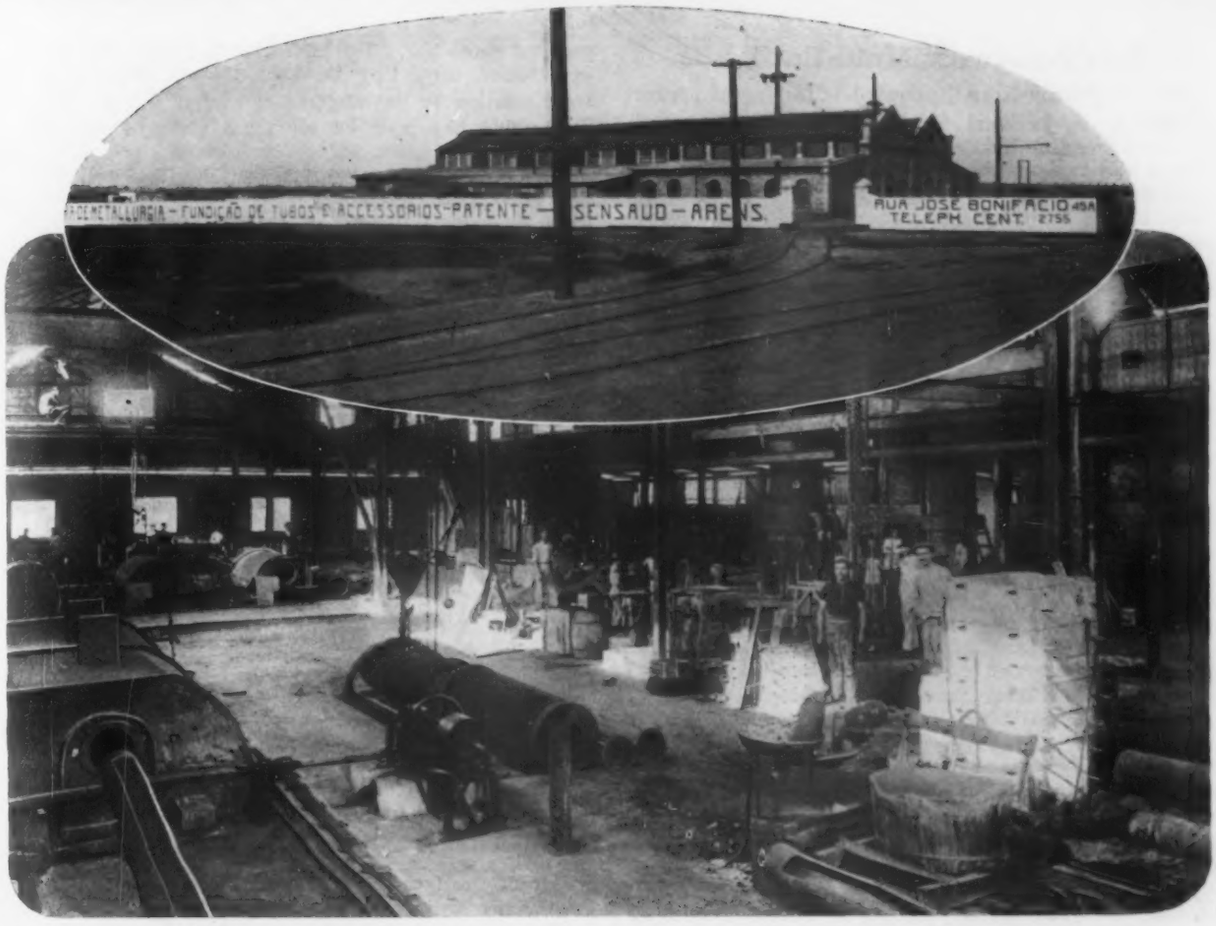
In the last two or three years two companies have been organized for commercializing this centrifugal process in general. One of these is the Centrifugal Cast Iron Pipe Co. of New Jersey, which controls the patent rights in North and Central America, and the International De Lavaud Mfg. Corporation, Ltd., with headquarters in Toronto, Canada, which owns all the rights in the remaining countries of the world. Of immediate interest is the recent installation in Brazil and Argentina of two new plants using on a large scale this process of making pipe.

A subsidiary company of the International De Lavaud Mfg. Corporation is the Brazilian corporation, Companhia Braziliera de Metallurgia, located at Sao Paulo, Brazil, and which supervises all the South American patent interests. A pipe-casting plant has been erected in one of the suburbs of Sao Paulo, and the plant covers an area of about 10 acres. There are 20 different De Lavaud machines now in operation at this plant, producing about 25 metric tons of pipe daily. With the equipment on hand, however, the capacity may be increased to 100 tons daily.

The iron is melted in three cupolas. The pig irons used are made from the ore mined in Minas Geraes, Brazil, and imported pig iron. The mixture used contains 30 per cent national or Brazilian pig iron and 70 per cent imported iron. It is expected by some that the iron industry of Brazil will find available in the near future native pig iron in larger quantities so as to supply other South American



A Battery of 20 of the 40 Centrifugal Machines in the Buenos Aires Plant. The oval illustration reveals the pouring of the metal into the machines while pipe are being removed from others


COMPANHIA BRAZILIERIA DE METALLURGIA – FUNDIÇÃO DE TUBOS E ACCESSORIOS – PATENTE – CENTRIFUGAL – SENSAUD – ARENS.
RUA JOSÉ BONIFACIO 45A
TELEPH. CENT. 2755

The Brazilian Plant at Sao Paulo and a Corner of it with Some of the Cupolas. Centrifugal machines for various sized pipe

countries, rendering unnecessary the importation of foreign iron and making South America a self-sustaining continent in this industry. Some of the illustrations show features of the plant of the Companhia Brazilieria de Metallurgia, the one at the head of this article showing the various sizes being produced, all the pipe having been hydraulically tested by the testing machine near the center of the picture.

In the city of Buenos Aires, capital of the republic of Argentina, the process of manufacturing cast-iron pipe by centrifugal force is being commercialized by a corporation known as the Compania de Talleres Metalurjicos, and certain features of this company's plant are shown by illustrations herewith presented.

The iron is melted in 22 small cupolas with bottom discharge, and the plant is equipped to cast 100,000 metric tons of pipe per year. Already 40 machines are in operation, producing pipe of different sizes. All the iron used in the Argentine plant is imported.

Hydroelectric Power and Canadian Iron Ores

Application of hydroelectric power to mineral development was the topic dealt with recently by J. Walter Evans, Belleville, Ont., at a meeting of the Hastings County branch of the Canadian Mining Institute. The production of electric energy that will sell at $10 per hp. was declared by Mr. Evans to be possible, for use in develop a steel industry in Hastings County. "In late years the development of the electric furnace has demonstrated that magnetite ores high in sulphur and magnetite ores high in titanium can be smelted successfully in the electric furnace," said Mr. Evans. "With power at $10 per hp., and charcoal at $14 per ton, pig iron can be made at the rate of 100 tons per day at a cost of $25 per ton. There is available in Hastings County over 20,000,000 tons of iron ore." The speaker has located several ore bodies that strongly attract the magnet which are as yet untouched and are not included in the above estimate.

There are other uses for electrical power, such as smelting molybdenite concentrates for the manufacture of ferromolybdenum. There are large bodies of sulphide ores suitable for the manufacture of sulphuric acid, and the iron residue plant makes a very fair iron ore. It is too high in sulphur to be used in a blast furnace without mixing it with low sulphur ores, but with electric furnace treatment it makes a good grade of low sulphur pig. If a smelting plant were built at Belleville, Ont., of a size sufficient to treat 200 tons a day, it would mean the use of 15,000 hp., and the development of a steel industry, which would in turn bring many other industries in its train. Very little is known at the present of the composition of many of Hastings County ores; as an instance, it has been shown that the titaniferous ores carry 0.4 per cent vanadium and that the vanadium can be retained in the pig iron, and the titanium slagged off.

There is no question about the quality of the metal made from these titaniferous ores in an electric furnace, claimed Mr. Evans, and, with the enormous bodies of ore which are to be found throughout Canada and the amount of water power available, in many cases as yet undeveloped and in close proximity to the ore deposits, an industry started in Belleville would develop others of like nature in other parts of Canada, so that Hastings County, which was the pioneer county in mining the first iron ore mined in Ontario, and the pioneer in the direct smelting of titaniferous ores, may yet be the pioneer in the iron and steel industries in Ontario, utilizing all Canadian ores and all Canadian reagents for the complete conversion of ore into refined steel.

Semi-Automatic Multi-Cut Lathe

The multi-cut lathe illustrated is the latest product of the R. K. LeBlond Machine Tool Co., Cincinnati. This is a semi-automatic machine on which one or more facing and turning operations can be performed simultaneously, one operator running several machines. The lathe can be supplied with different drives and equipment to adapt it to a variety of duplication work. The work can be centered, held on the arbors or chucks, and is operated either pneumatically or by hand. The machine is especially useful on work that has been previously bored, reamed and rough turned on a turret lathe, or automatic machine, and remains to be finished, turned and faced.

The bed of the lathe is of a special anvil section, ribbed and mounted on a cabinet base, in which the pan and chamber for the cutting compound is cast. As the pan is an integral part of the bed it stiffens the entire machine. The carriage operates on a broad slide extending practically the full length of the bed and is provided with double taper gibs with fine thread adjustment. The cross slide for mounting the compound or plain rest is cast integral with the carriage.

A feature emphasized is that the carriage can travel past the head and tailstock and keep the slides continuously covered. This long carriage bearing is claimed to be a large factor in the general rigidity of the machine, thus making practicable the use of gang tools, forming slides, etc. The feed rack is set exactly in the center of the carriage slide. A plain block rest mounted on the cross slide is furnished with the machine, equipped with a single screw tool post and an adjustable positive cross stop. The swivel is graduated in degrees for angular turning to compensate for wear on the slides. The T-slot bolts are placed in a circular T-slot, enabling the top and swivel slides to be firmly clamped after setting the work.

A lever tailstock permits of the quick removal and replacing of work with a single movement of the operating handle. The center is brought into contact with the work at any desired pressure by a conveniently placed lever, and further movement of the same lever rigidly locks the tailstock barrel and clamps the spindle.

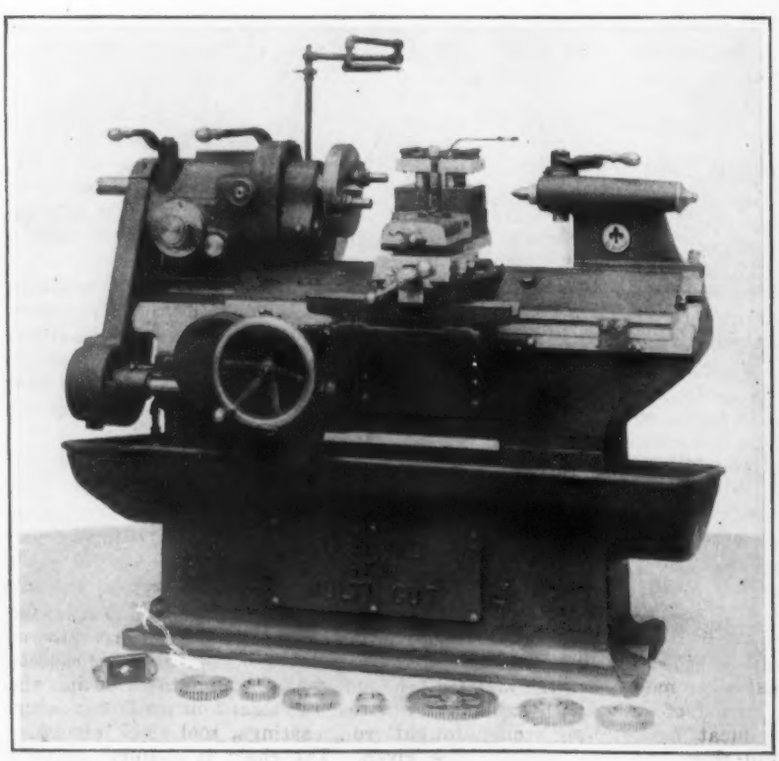
The taper turning attachment consists of a rigid bracket bolted to the front of the bed, which carries an adjustable taper guide bar and a sliding shoe engaging the guide bar. The sliding shoe is attached to the cross slide, imparting to it an in and out movement with relation to the angular setting of the guide bar. The guide bar may be set from straight to 4½-in. taper per ft., either side of the center, and clamped in the selected position by two heavy T-slot bolts. The taper guide bar and sliding shoes may be replaced by a form plate and roller for the automatic duplication of irregular shapes.

The plain facing attachment faces diameters up to the full swing of the lathe at right angles to the turning centers. The feed of the facing slide is obtained entirely by the relative movements of the flat and dovetail slides that are gibbed and adjustable for wear. The facing rest is fed forward on a broad square lock slide to which it is gibbed. The facing bar slide carries the swivel guide bar which is fed along the bed at varying rates of speed.

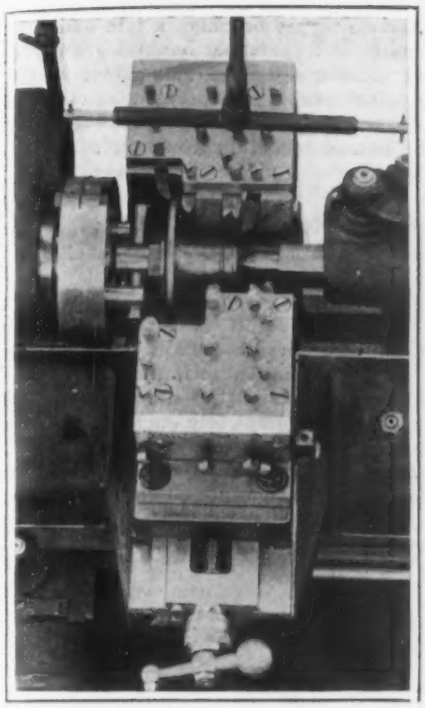
The sliding shoe on the facing attachment slide engages the swivel guide bar which may be set at any angle within the range, imparting a vertical motion to the shoe which is transmitted through a rack and hardened pinion to the cross slide. By changing the angularity of the swivel guide bar the feed of the cross-slide is varied or timed to complete its work at the same time as the turning slide, or, it may be accelerated to finish ahead of the turning slide to permit of overlapping on forming and turning tools, or vice versa. The feeds to both turning and facing slides are tripped by the same clutch and will duplicate within close limits of accuracy.

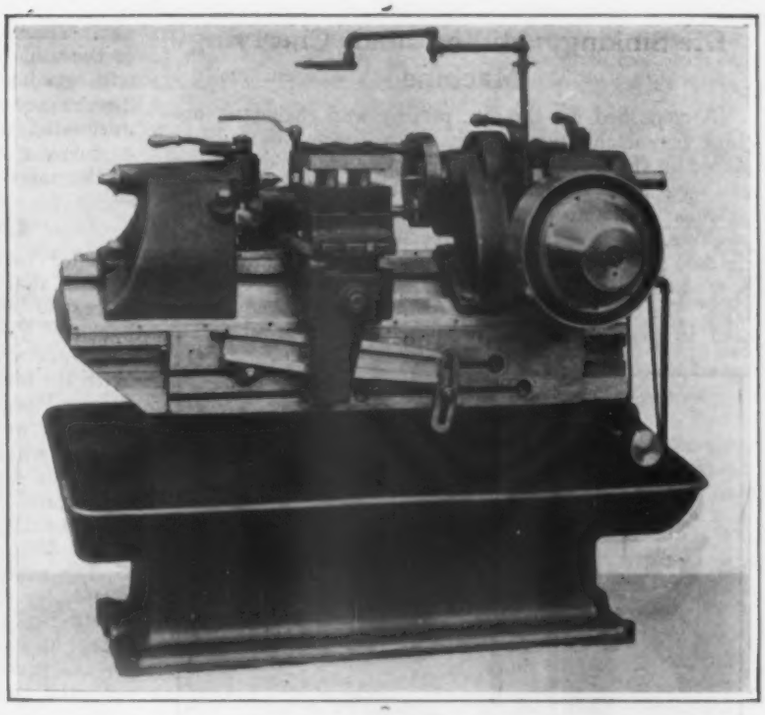
The standard tool block, furnished with the machine, is arranged for multiple tools which can be held parallel, or at any angle, by reason of the spacing of the binder screws. The tool block is adjustable to the center of the lathe and firmly clamped in position by two heavy bolts. The universal facing attachment, as its name indicates, is adapted to angular facing operations on bevel gears, etc. When used in connection with a taper attachment the back and face angles can be turned simultaneously.

The lathe is built in two sizes, one with a 6-in. swing and 10-in. capacity between centers, and the other with a 9-in. swing with 16-in. capacity between centers. Three types of headstocks are furnished with the first and four types with the latter machine. Either size can be furnished with screw or quick lever



Semi-Automatic Lathe Especially Adapted for Finishing, Turning and Facing Work That Has Been Previously Bored, Reamed and Rough Turned. Different types of head stocks, tailstocks, facing attachments, and rests are provided for various classes of work. The end view shows the special anvil type bed and the long carriage bearing that passes either the head or tailstock





The Rear View Shows the Right Angle Drive, Universal Facing Attachment and Quick Acting Tailstock. The taper bar can be set at any angle to carry the feed of the facing attachment with relation to the travel of the turning slide after the machine has been set up to take care of castings which are harder than standard and which may have more or less metal to remove. A special tool equipment with wire cutting tools is shown furring and facing an automobile hub.

acting tailstock, plain or universal facing attachment, taper attachment, compound rest, drawing or closer chuck and collets.

A brief description of the construction of style A headstock for the 6-in. lathe will, with changes for different work, answer for the different types furnished with different machines. The spindle bearings are renewable bronze boxes, babbitt lined. A friction countershaft, with an automatically operated brake, is supplied, and the countershaft is provided with a split pulley to facilitate speed changes when required. Double helical or herringbone gears are used. The headstock is oil tight and the gears and friction clutches run in a bath of oil. Style D headstock provides for high speeds adaptable to work on brass, bronze, aluminum and free cutting steels of medium diameters on which it is desired that very high cutting speeds be maintained.

Mechanical Engineers Discuss Industrial Unrest

Industrial unrest was discussed at a meeting held in New York on the evening of Sept. 17 by the New York Section of the American Society of Mechanical Engineers. The leading speech was made by Dr. William M. Leiserson, formerly chief of the division of labor administration, working conditions, service, Department of Labor, Washington.

A protracted discussion followed, not much of which threw new light on the subject, and the meeting voted that the general subject should be continued in later meetings of the section. Dr. Leiserson's chief contribution was a historical presentation of the status of labor disputes from the early times of the nation. This he offered as a necessary background for the engineer fully to appreciate facts, and he then discussed present conditions with a claim that he is an impartial observer. This was not generally accepted by the meeting as indicated by those who entered into the discussion, partly because of his emphasis on a claim that the American Federation of Labor, which he described as constantly growing stronger, pointed the way to get democracy in industry. He recognized the tendency for the formation of independent unions and referred to the so-called company unions for securing collective bargaining. Many of these he denominated as frauds, remarking that employees will not get collective bargaining through them.

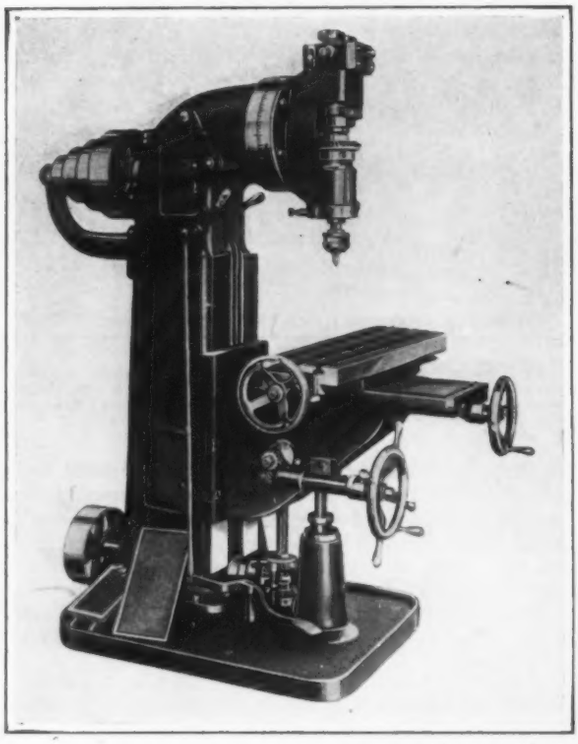
In his historic analysis he told how the period of rising prices of 1819 brought the first real labor movement in this country; that in the next period of rising prices, 1827-37, the time of the wildcat banks, a national labor party was organized and there were proportionately as many organized to the total number of wage-earners as now. The latter part of the period up to 1850, the longest industrial depression ever known, there were few labor disputes, but in the succeeding period up to 1855, with rising prices, there was again an active labor movement. The condition was repeated in the upward price tendencies of the period after the war, and then with the depression of 1870 came the reduction of labor troubles.

Richard H. Rice, acting manager of the Lynn works of the General Electric Co., was asked to open the discussion. He deplored the fact that we seem to be forgetting the lesson of the war, that of co-operation. He insisted that bargaining is defective when attempted through a union by men not of the plant or acquainted with its problems, but men selected for other reasons. He referred to the shop organization at Lynn now in operation some 8 or 9 months as a mechanism for discussing industrial problems. Here the men are acquainted with the local situation. The management does not discriminate against union affiliations but recognizes that a man whether a member of a union or not has the right to a job. He could not see any value in members of the working staff sitting on a board of directors, as such could not contribute anything to the business and financial problems coming up for decision before such a board.

A chart showing the development of iron ore into iron and steel has been copyrighted by S. C. Dickerhoff, Jr., Bethlehem, Pa. Starting with the blast furnace, the iron ore is taken through the different processes to the finished products, which are enumerated in detail with explanatory notes. Typical analyses of iron ore, pig iron, wrought iron, castings, tool steel, structural steel, etc., are given. The chart is comprehensive in its scope, neatly arranged and clearly outlines the processes and their results. A copy can undoubtedly be had for nominal sum by addressing Mr. Dickerhoff.

Die-Sinking, Milling and Cherrying Machine

A combined die-sinking, milling and cherrying machine for machining complete drop forge dies is being placed on the market by the Riverside Machinery Depot, exclusive selling representative, 17 St. Aubin Avenue, Detroit. This machine, which is known as the Daly machine, has a number of special features which are claimed to result in a saving of time. The headstock is of cast iron, 15¾ in. in diameter, of the revolving type. On this headstock is shrunk a steel band graduated in degrees for convenience in setting up. The



A Smooth Finish Imparted by the Cutter and Quick Operation of the Knee Are Emphasized as Features of This Die-Sinking, Milling and Cherrying Machine

milling spindle is 6 in. long, tapered, 3⅜ in. and 2⅜ in. in diameter, and runs in bronze bearings, with provision for wear. It is fitted with a No. 11 Brown-Sharpe taper hole, and is arranged with a locking pin for use when removing cutters, and with right and left adjusting collars for permanently adjusting the spindle and drive gears. A ball thrust bearing is provided at each end of the spindle to absorb the end thrust. The spindle is driven through bevel gears, and is lubricated from a large oil reservoir.

The cherrying attachment is incorporated in the revolving head, being driven direct from the main shaft through a train of bevel and spur gears, which is emphasized as providing a smooth finish. The head is designed to accommodate cutters from 3/16 to 6 in. in diameter. By providing a train of spur gears for the cherrying attachment, the correct cutter speed can be obtained by changing the gears.

The machine is equipped with a four-step cone, the largest step being 14 in. in diameter by 3½-in. face for a double belt drive. A clutch to stop and start the spindle without stopping the belt is provided in the cone. Sliding gears on the main driving shaft give a total of eight spindle speeds in geometrical progression. The machine is also furnished for variable speed motor drive, a 5-hp. motor being recommended with a speed variation of 4 to 1. The knee is counter-balanced to eliminate vibration and gibs are provided for wear. A power feed raises and lowers the knee, with a gear ratio of 3½ to 1 giving a speed of 8½ in. per min. The knee is supported by telescoping screws, which run in ball thrust bearings. The saddle is provided with gibs to take up for wear.

The table has three 11/16-in. T slots, and is driven direct through a lead screw operating in a long bronze nut. There are ball thrust bearings inside and outside of the table frame. All operating handles are provided with graduated collars, and have ball thrust bearings. The rotary auxiliary table is operated by hand and graduated in degrees, like a dividing head, and requires 40 turns of the handle to obtain a complete revolution of the table.

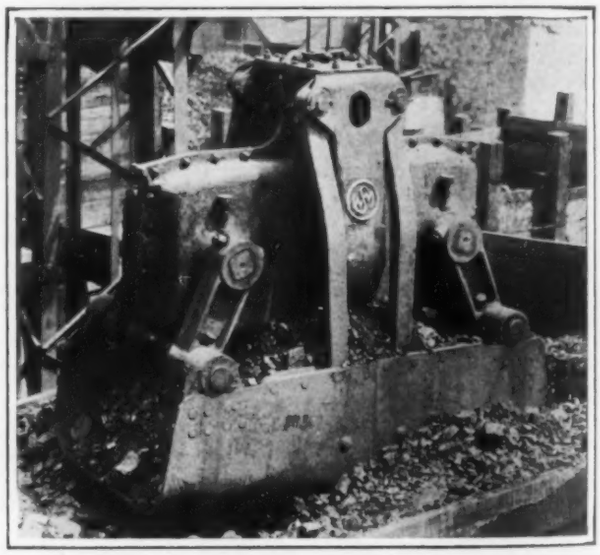
Geared Clam-Shell Bucket

The ordinary construction of a clam-shell bucket is such that a large quantity of the material handled comes in contact with the operating parts of the bucket. The inevitable result is excessive wear of those parts, due to the abrasive action of the material. With the idea of eliminating these faults, the Wellman-Seaver-Morgan Co., Cleveland, has developed a bucket with the working parts completely inclosed in a tight casing, where they are constantly lubricated. This bucket is especially designed for handling coal, sand, gravel and cinders. It is operated by two ropes and, consequently, can be handled by practically any type of two drum hoist.

The power casing, from which the shells are suspended, is divided into two sections which are bolted together to form two tight compartments inclosing the operating gears, and a third compartment in the center for the power wheel and the deflecting sheaves for the operating ropes. The cutting edges of the shells are pin connected to the side bars, suspended from lugs cast in the top part of the casing.

The wide opening of the shells enables the bucket to fill-in material which would otherwise be too shallow. The shells are open at the back to prevent compression of the material when the bucket is closing. The rigid connection of the rear arms to the operating shafts and to the shell shafts is emphasized as providing positive alignment of the shells; and side lash is further prevented by side bar guides attached to the shells.

A power wheel being directly connected to the



The Operating Parts of This Bucket Are Inclosed to Protect Them from Wear Due to the Abrasive Action of the Material Handled

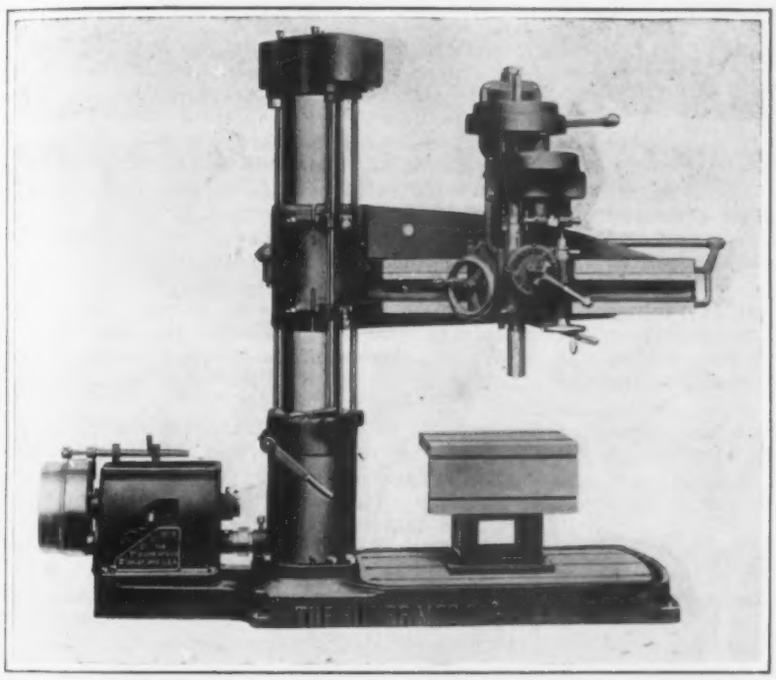
pinions, the digging effort is the same from the beginning to the end of the closing operation. The opening of the bucket is effected by an opening rope attached to the small section of the power wheel, and wound in the opposite direction from the closing rope. In this way the bucket is opened by power, quickly and completely. On account of the small diameter of the closing pinions the bucket requires only a small amount of rope either for opening or closing, resulting in a high speed of operation.

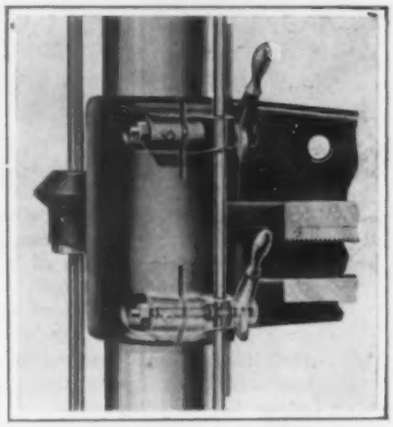
The bucket is compact in design, requiring a minimum amount of head room for its operation. When open only a small part of the casing extends above the shells, thus giving stability on the pile, and a lessened tendency to upset. It is pointed out that the rope arrangement is such that the bucket is well balanced always, whether in open or closed position.

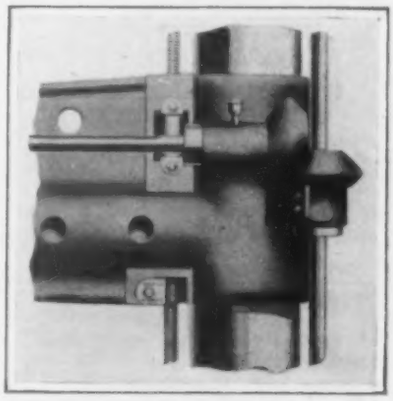
New Radial Drilling Machines

Radial drills built in sizes of 2½, 3 and 3½ ft. are announced by the Silver Mfg. Co., Salem, Ohio. The column is semi-steel and is a new design. The inner column or post has a bearing on the base, extends to the top without taper, and is provided with ribs running nearly the entire length, which are of such size that they just clear the drive shaft. This construction is emphasized as affording superior strength and rigidity. In addition to bearings at the top and bottom, the column is built with a middle bearing thus to increase the rigidity. The outer column telescopes the post and rests on a ball bearing. The clamping device is situated within easy reach of the operator and can be tightened either by hand or foot.

The arm, which is of pipe section design, is ribbed to resist torsional or bending strains. It is raised and lowered by power at a ratio of 2 to 1, and is provided with an automatic knockout both at top and bottom.







The Column of This Radial Drill Is of Special Design to Give Extra Strength and Rigidity. The arm is clamped to the column by two levers and a split hub through which the controller shaft runs, thus to prevent the elevating screws from being set in motion while the arm is clamped to the column. A safety nut, shown in the lower right hand illustration, is to prevent the arm from dropping when the threads become worn

The arm is clamped to the column by two levers. The bolt to which the lever is attached not only acts as a limit screw to prevent sagging but also serves as a binder. In addition to this, when the lever is placed in the clamping position it tightens the split hub through which the controller shaft runs, thus preventing the elevating screw from being set in motion while the arm is clamped to the column, and avoiding possibility of wrecking the machine. A safety nut provided is pointed out as preventing the arm from dropping when the threads become worn in the elevating nut. The safety nut runs idle, there being ⅛ in. clearance between it and the arm. When the threads wear out in the elevating nut the load is transferred to the safety nut which brings it flush with the arm, thus warning the operator in ample time to make replacement and avoid serious accident. The safety nut also provides for the continuous use of the machine while the elevating nut is being replaced.

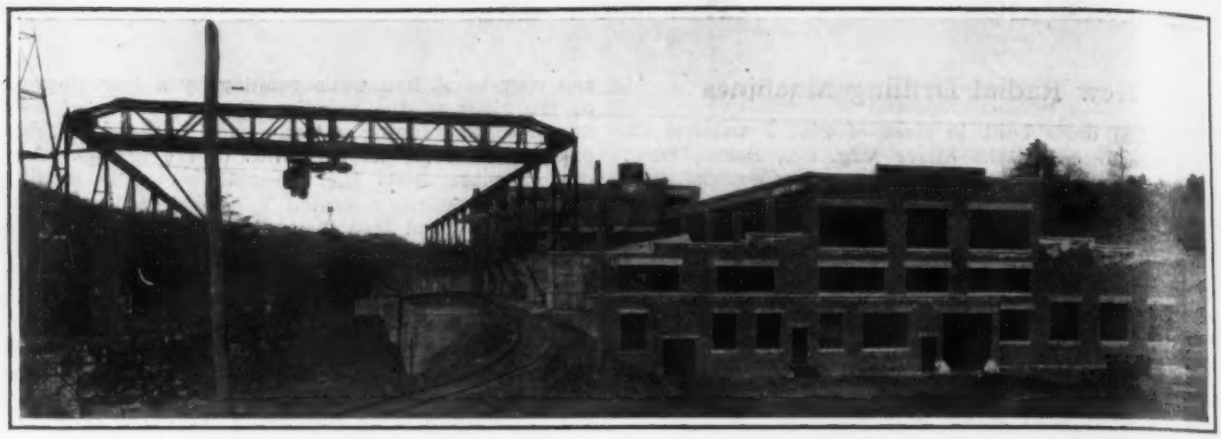
The head is operated by a large hand wheel through a rack and pinion to enable the operator to run the head rapidly along the arm. It is pointed out that the head is designed to afford wide bearing for the spindle sleeve, thus to insure accurate drilling at all times. The back gears are mounted on the head and provide two speeds. They are of the sliding gear type and may be shifted while running by a lever located at the right of the spindle. Eight changes of feed are provided, ranging in geometrical progression from 0.005 to 0.040 in. per revolution of the spindle. Any one of these feeds may be obtained while drilling by two conveniently located T handles which are indexed. The hand feed through the worm may be fed ahead of the power feed, thus saving time when starting to drill. It is controlled by a single lever which also acts as a quick return. The feed worm and worm wheel are fully inclosed and run in oil.

A depth gage and automatic feed trip are provided for drilling to a predetermined depth. A large dial index is supplied, graduated in sixteenths of an inch, the graduations being sufficiently far apart to permit working to sixty-fourths. The tapping attachment is of the expanding ring type and is operated by a lever extending under the arm to the front of the machine.

The quick change speed box is bolted to the base and is provided with an oil pan which permits running the gears in an oil bath. Six changes of speed are obtained which with the back gears on the head provide 12 speeds in all. To overcome shock when changing speeds, the cone gears are kept rotating at the lowest speed by an auxiliary drive between the pulley and cone shafts which is automatically engaged and disengaged when raising and lowering the lever.

Four methods of drive can be supplied: a six-step cone pulley, which gives 12 speeds in all; speed box drive; speed motor in connection with the gear box, and a variable speed motor connected to the lower shaft by gears. A box table with planed T slots is provided in the regular equipment, while a universal table and oil pump with fittings can be supplied.

Crane business is developing in a small way, but some of the crane companies are very anxious for orders and price-cutting is a natural development. The Midvale Steel & Ordnance Co. has bought a 40-ton ladle crane for its Coatesville, Pa., plant from the Alliance Machine Co. The Lehigh Valley Railroad has bought a 10-ton crane from the Whiting Foundry Equipment Co. The Robins Conveying Belt Co., New York, is in the market for two 10-ton cranes and the Cheswick Power Co., Pittsburgh, is inquiring for a 75-ton power house crane.



Mechanical Handling of Foundry Material

Manual Labor Replaced by Cranes and Hoists Except in Cupola Charging—Heating System for Severe Low Temperatures

AT Springfield, Vt., that machinery manufacturing rural community of worldwide fame, there has been recently installed by the Vermont Snath Co. a foundry incorporating in its plan and equipment most of the economies in arrangement and handling of materials as have of late become approved practice in foundry engineering.

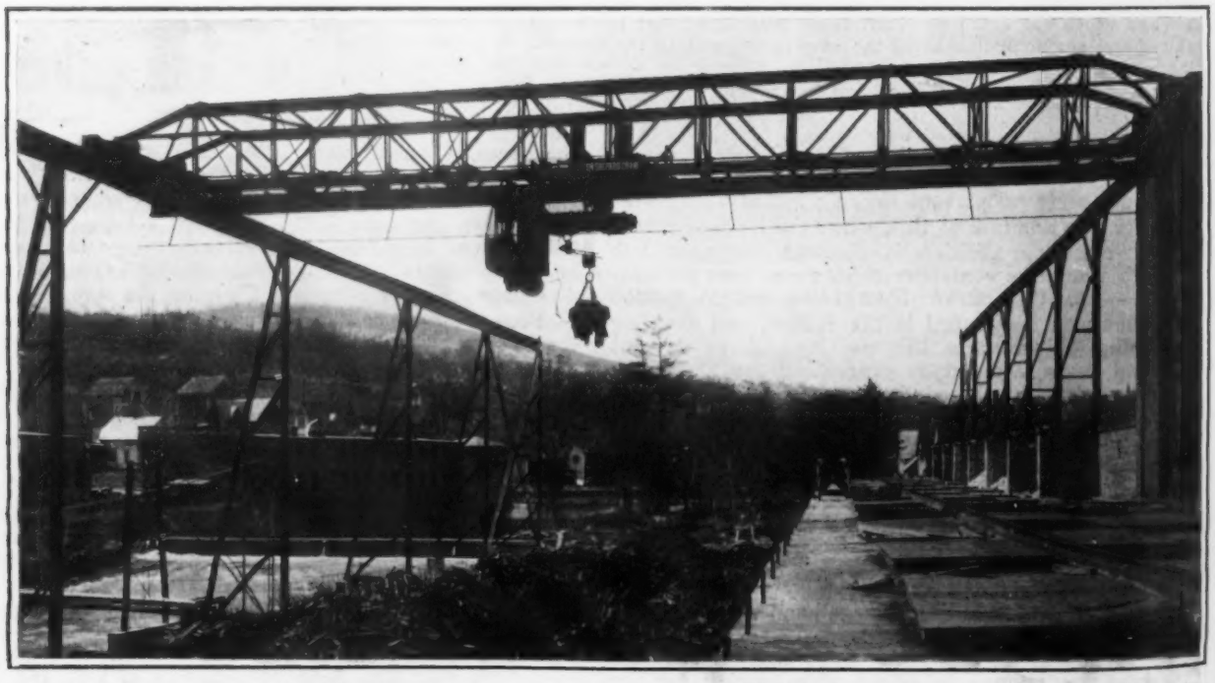
The company, founded more than half a century ago, takes its name from the original wood-working plant that turned out crooked-backed scythe snaths, those implements of agriculture so well known in the days before the mowing machine and reaper. After Springfield became an important machine-tool manufacturing center this company turned its attention to iron founding, and the wood-working business gave way to a plant turning out the high-grade iron castings required by these factories.

It is the intention of the layout of the buildings and equipment to provide for all operations at the minimum labor cost, from the time the material is delivered in loaded cars to the time the finished material is turned out and loaded. Owing to the fact that there is a local supply of good molding sand, sand-cleaning and storage facilities were constructed at one end of the foundry on the core room side, to which the sand is hauled by motor trucks, dumped into hopper from which it is elevated, screened and distributed into its proper bin by belt conveyor.

The design of the buildings shows that light, one of the most important requisites for producing best and maximum foundry work, has been featured in this installation. The general foundry layout and main features were designed under the supervision of W. M. White, president of the company, and the details of construction by E. N. Pike, chief engineer New England Structural Co., Boston.

The railroad siding approach to the foundry is carried over the top of concrete bins, making it possible to unload by gravity foundry sands, coke, coal and other materials. Pig iron is handled by a 5-ton capacity overhead traveling transfer crane of 90-ft. span equipped with a magnet. The crane runways are placed at an elevation of 47 ft. above foundation in order to make it possible for a monorail hoist to carry the load of iron over the top of standard railroad cars placed on the elevated structure and to deliver the iron directly to the cupola.

The scales are located on the charging platform to



Raw Materials Are Stored Alongside the Foundry. The ramp shown above allows for drawing the stored sand, coke, etc., directly upon the foundry floor. The 5-ton crane carries the pig over the track and bins and transfers to a monorail running directly to the cupola with its load, as shown in the picture on the opposite page.

Crane Equipment Is Provided on Two Levels, the Upper for Distributing Materials and Parts, and the Lower for Molding Operations Under Direct Charge of the Molder

which the hoist delivers the iron without handling. The only manual labor employed in transporting materials before the melt is in charging them into the cupola. This operation is performed by hand in order to secure equal distribution and thus insure uniform and best melting conditions.

Through the center bay of the foundry there are three traveling cranes on a lower level. These machines are three-motor standard overhead electric traveling cranes with controllers mounted on the trolley arranged for control by pendant cords from the floor. The scheme in molding is to provide sufficient crane service so that each gang of molders can have unlimited crane service under the control of the molder. The crane on the upper level is used largely for distributing metal, flasks, castings and for removing waste. The track which connects the yard crane with the cupola charging platform is extended through into and over the foundry, making a very valuable connection between the foundry yard and the foundry molding floor.

Crane Removing Cupola Scrap

The side floors are served by light capacity electric travelers, also arranged for control by pendant cords from the floor. The bridge motion and hoist motion of this machine are motor controlled with controllers attached to the hoist. The movement of the trolley is by pendant hand chain.

The side floor opposite the cupolas is used for making the large number of dry sand cores required in the kind of castings turned out. The core room is served by a 3-motor cage operated light capacity high-speed overhead electric traveler. The crane equipment was supplied by the Shepard Electric Crane & Hoist Co., Montour Falls, N.Y., under the direction of W. C. Briggs, New York district manager.

The heat and power are supplied from a power plant located on the opposite side of the river in the original plant, the pipes being suspended ingeniously over the river. The heating system, forced circulation of hot water, was installed by the Parks-Cramer Co., Fitchburg, Mass. Owing to the fact that the temperature in Springfield varies from 40 deg. Fahr. below zero to 100 deg. above, the question of heat and ventilation was a consideration of the greatest importance.

The heating of the foundry is ac-

complished by cast-iron wall radiators placed under the side windows, supplemented by pipe coils placed along the column between the two crane levels. The hot-water heating system is found ample to maintain a temperature of 55 deg. Fahr., which is enough except in extreme weather. The pressure and circulation of water is maintained by two direct-driven turbine units.

The system is designed to operate with an outgoing water temperature of 205 deg. Fahr. Frequently a water temperature below 140 deg. Fahr. is all that is required. In the early morning or late afternoon a slight increase in the volume of steam delivered to the heater is quickly reflected in the higher temperature of the water and a quick response in the room temperature to a point necessary to offset the lower outside temperature.

This system makes it possible for one man, in this case the engineer, to control the entire heating of all the buildings. A thermometer located outside of the power-house window enables him to estimate the water temperature required to maintain the plant to a proper degree of warmth.

The power plant consists of both water and steam. When operated by steam two 150-hp. engines can be run together or separately or in combination with the water wheels to develop the electric current used for driving machinery throughout both the new and the old plant. In the wintertime these engines can be operated non-condensing and the exhaust utilized to heat the feed water and water for the heating system. If the exhaust from one engine is sufficient, as it has been found to be under normal conditions, the other engine may be operated at full economy as a condensing engine.

Conference on Trade With New States

A conference of business men from all parts of the country to consider practical plans for establishing and maintaining favorable trade relations with the new nations created by the peace treaty, will be held in New York next month, in conjunction with the Foreign Trade Convention, Oct. 16 and 17. According to an announcement by the American Manufacturers' Export Association, under whose auspices the convention is to be held, numerous requests have been received from manufacturers and exporters for information on the possibility and advisability of attempting to establish their products in these markets.

It has been decided, therefore, to call a special conference on trade with Jugo Slavia, Czecho-Slovakia, Poland and Lithuania at which official and commercial representatives from these countries may present their views of the situation to representatives of American commercial and financial interests, and where Americans who have been investigating conditions on the ground may exchange the results of their observations.

Machine Tool Builders' Convention

While the program is not completed for the annual convention of the National Machine Tool Builders' Association, to be held at the Hotel Astor, New York, Oct. 15 and 16, it is hoped that Alexander Luchars, publisher of *Machinery*, who was sent abroad as special agent of the Department of Commerce to study machine-tool conditions in European countries, will have returned to New York in time to address the association. Stanley H. Bullard, of the Bullard Machine Tool Co., Bridgeport, Conn., as chairman of a committee which has been investigating the project of publishing a catalog of American machine tools, will submit a report, which, it is expected, will be favorable to the catalog proposition. The world situation as it affects the machine-tool industry will be one of the principal topics at the convention, and competent speakers will be on the program to discuss various phases of this question.

Steel Corporation's Safety Work

Some idea of the large amount of money being spent by the United States Steel Corporation in safety work in the plants of its subsidiaries, was given recently by John A. Oertel, safety engineer for the Carnegie Steel Co. at a luncheon of the Pittsburgh Association of Credit Men. Mr. Oertel first gave a brief summary of the safety movement among employees in the plants of the Steel Corporation, and stated that Judge E. H. Gary had been one of its warm supporters, and always cheerfully approved appropriations for carrying on safety work. In his address, Mr. Oertel said in part:

"The United States Steel Corporation was one of the first organizations to engage in safety work and to-day, after 12 years' experience, is still enthusiastic about it. It is so enthusiastic about it that last year the corporation spent $1,110,000 on its safety work, an average of $4.50 per employee. One in every 50 employees is serving on a safety committee and being held responsible to a greater or less extent for the safety of his fellow workmen.

"Get a picture of that in your mind's eye, and meditate upon it. It means that more than enough people to populate Wilkinsburg or Braddock have been saved from serious injury. It has kept them on the job and enabled them to support their families and give their children an education. The figures of the Carnegie Steel Co., one of the constituent companies of the United States Steel Corporation, are no less striking. During the year 1918, that company had 1985 less lost time accidents than it had in 1917—enough men to run a good-sized steel plant were kept at work during one of the most critical periods of our country's history."

Unique Safety Program

The National Safety Council announces an affiliation with the University of Cincinnati for the purpose of carrying out a program which includes the establishment of an industrial medicine division at the University of Cincinnati where medical students and graduate physicians will be given special training not only in industrial medicine, but in industrial relations, including sanitation and all the fundamentals of safety work as well. The student physicians alternately spend part of their time in school and part in the field among the industries of Cincinnati, Dayton and other Ohio cities receiving actual experience in the work for which they are being prepared. The enterprise was conceived by and is being financed by the industrial leaders of Cincinnati and the vicinity, who have guaranteed a fund of about $40,000 annually for five years.

Trade Conference Topics

At the International Trades Conference, Sept. 30 to Oct. 3, in Atlantic City, findings of committees appointed by the Chamber of Commerce of the United States will be considered. The major topics, in which all countries have a common interest, will be finance, international competition, and living costs. Among the large foreign delegations will be the British headed by Sir Arthur Shirley Benn, M. P., formerly British vice-consul, Mobile, Ala., managing director Hunter, Benn & Co., and formerly a member of the London Common Council. Heading the French delegation will be Paul Schneider, president Creusot Works, and chairman of the Italian delegation will be the Hon. Guglielmo Marconi. The Belgian delegation will be headed by M. Van de Vyvere, minister of state, and formerly War Finance Minister.

The Youngstown Sheet & Tube Co., Youngstown, Ohio, in order to Americanize its foreign employees as far as possible, has decided to conduct a school for the benefit of all foreign-born and foreign-speaking residents of East Youngstown, Struthers and Hubbard. The school will be in charge of George B. Fout and the course will include not only the study of the English language, but the preparation of candidates for American citizenship.

Some Aspects of British Foundry Practice

No Notable Improvements Resulting from War Activity—Green Sand Molding Regarded Superior — More Apprentices Needed

(From a British Correspondent)

LONDON, ENGLAND, Sept. 1.—The president of the American Foundrymen's Association has been kind enough to say that in his tour of Great Britain he had been shown many things which he had not previously appreciated; and that is an interesting feature of most visits of American industrialists to this country. The writer a few months ago had the privilege of an interview with a leading American business man in quite another branch of activity, and curiously enough he received precisely the same assurance. This interchange, of course, is all to the good, but whereas the president of the American Foundrymen's Association has been more or less sweeping in his congratulations to us upon the state of development which foundry work in Great Britain has reached, the other American to whom reference has been made was more cautious, and qualified what he said by adding that it may have been that he was shown special and probably the better instances of what we could do in this country.

It is exactly that point of view which I wish to emphasize in connection with foundry work. I do not suggest that American foundrymen were carefully taken to a few of the most prominent and most up-to-date factories in Great Britain and given the impression that they were typical of the whole country. They would, of course, be too astute to believe any such thing, but to be perfectly candid, and in order to give a true impression of British foundry practice as it is to-day, it must be said that the very fine foundries to be seen in the Sheffield works, for instance, are really only typical of Sheffield; they are certainly not typical of the whole country, and looking at questions of foundry practice broadly it cannot be denied that there is much to be done in Great Britain before we achieve that general level of excellence which is so desirable.

The Supply of Molding Talent

The outstanding feature is the education of the foundryman. There are too many instances—and this has been put on record quite recently—of youths and men in our foundries to-day who are scarcely able to write their names legibly and who cannot read a drawing. That, of course, is deplorable, for upon the improvement in the education of foundrymen generally depend the more intelligent use of machinery and the greater prospects of improving the standard of equipment.

During recent years the British Foundrymen's Association has done wonderful work in improving the status of the foundryman and it recognizes to the full the need for better educational facilities. Yet to-day, with the magnitude of the British engineering industries, the British Foundrymen's Association, whose membership is confined to the foundrymen, can only muster 1600 members, and the greatest addition to that number has been in recent years. The difficulty is in securing the right kind of boy to enter the foundry, and that of course in turn depends upon the facilities offered to lads to take up foundry work.

Those who have studied the problem most are of the opinion that the old apprenticeship system must be reintroduced. There is little doubt, despite all that has been said during the war of the ability to turn out efficient workers in an incredibly short space of time, that what was done was to train a girl or boy, a man or woman, to do a certain operation. The system did not produce a specialist operator with a wide view. The outlook was so circumscribed that at the best we only had a semi-skilled worker. Unfortunately, the old system of a legally binding apprenticeship has fallen into disrepute in many industries in Great Britain in recent years, and the result has undoubtedly been a lowering of the level of intelligence.

If we take the foundry, the system at present is as follows: A boy of a low intellectual type enters a foundry as a so-called apprentice. Nobody is satisfied with the class that is attracted, and yet no steps seem to be taken to improve the outlook. These lads are taken in as so-called apprentices. For the most part they are little more than errand boys for a long period, and during the rest they have to pick up their trade as best they can. Thus we are faced with the position that while economic conditions have placed molders in a very favorable position, with good wages, compared with other industries, yet we have a great danger of a lowering of the standard of efficiency.

Tendency to Combine Jobbing Shops

Probably, leaving aside the large shops to which reference has already been made, the position is accentuated by the existence of so many small jobbing shops which are undoubtedly more abundant here than in America. Attempts are at present being made to standardize and combine a number of these small shops, but how far this effort will be successful is too early yet to say. The great need is the application of more scientific and precise methods in a great many of our foundries. The average molder, by intuition as much as anything, turns out excellent work, but nobody in these days can pretend that a system which does not insure the same result being achieved dozens and hundreds of times with unerring accuracy can be regarded as satisfactory, and that is one of the shortcomings of present-day British foundry practice. That the difficulties are realized and efforts are being made to overcome them, however, is a pleasing feature of the situation. Moreover, the war has furnished us with ample evidence that with organization and scientific treatment, the aim in view can be quickly achieved.

Machine molding has not made the progress in this country that it has in America, and that again is partly attributable to our less concentration and the inherent habit of the British nation to shy at standardized articles. Pattern molding is still practised to a much greater extent for that reason. With greater standardization pattern molding would soon become obsolete except for special work; at present too many articles are regarded as special when as a matter of fact they ought to be produced in large numbers, thus allowing of the use of machine molding and bringing down the cost.

Backwardness in Applying Scientific Knowledge

It is astonishing how much is still left to the individual skill and intuitive knowledge of the molder, and this is the more surprising when one remembers what a remarkable advance in this and other directions there has been in recent years in metallurgical operations. To a large extent, of course, little attempt was made to remodel existing foundries during the war. The one aim was output and only such improvements and adaptations as were necessary to this end were carried out.

At the same time, a vast amount of knowledge was accumulated by the Ministry of Munitions which ought in some way to be made available for the benefit of the nation, seeing that it was acquired at the expense of the nation. No systematized method of doing this, however, seems to have been devised, and so far we are being treated to spasmodic publications by some of the gentlemen who made investigations on behalf of the ministry. A good example of this is the inquiry that was made in America by Prof. P. C. H. Boswell regarding the sands used for foundry purposes in America and the comparison between American and British

methods. Apparently some report upon this was drawn up and made use of for the purposes of the war, but the first publication took the form of a paper before the annual meeting of the British Foundrymen's Association, and presumably that paper was not complete. The one main point brought out as the result of this investigation was that millions of pounds sterling are being lost by the failure to use what is referred to as an ideal sand, and much valuable information on this point is given. Professor Boswell came back convinced that American green sand molding falls behind English practice. He also expresses the opinion that the venting of American molds is not so good as British.

Great attention is now being paid over here to chill casting with the object of reducing subsequent machining operations to a minimum. Particularly so is that the case with aluminum, and some recent attempts in this direction have produced some very fine castings in which absolutely no machining operations at all are necessary. These are only in small parts, it is true, but it is the beginning of a development which is bound to go on rapidly and ultimately include much bigger parts.

A direction in which there is much room for improvement is a clearer understanding of micrographic analyses of metals. Sufficient use of photomicrographs in determining the qualities of castings is not made, and it is not too much to say that to the average founder and molder, and especially to the older type, the photomicrograph is a thing of mystery. This, of course, is closely bound up with the question of education. The writer, not long ago, was present at a meeting of foundrymen when a lecture on this subject was given and practically none of those present were able to discuss it. That is, of course ,a subject a little removed from the general conception of foundry practice, but it is one which cannot be ruled out in the future development of the industry.

A Record in British Steel Output

The following extract from the Glasgow *Herald*, Glasgow, Scotland, reveals some of the thoughts that are uppermost in British industrial steel circles:

A recent achievement by Lanarkshire steel workers comes as a ray of light in the gloom which pervades the industrial atmosphere. Working at a cold charge furnace of 45 tons capacity, they produced in a week 21 charges, or 980 tons, representing plates, rails and angles, an output unique in the records of the steel industry. In America, with a similar type of furnace, the highest output for a week is 12 charges of 600 tons.

It is worth while emphasizing the contrast, because at the moment there are doleful predictions of the impending ruin of the native steel industry consequent upon American competition, and the British steel melter is compared unfavorably with his American rival, who, it is claimed, surpasses him in capacity and industry. Pessimistic observers of our industrial state too readily assume that "ca'canny" has become an axiom in British labor circles, and that our old prowess in industry is in danger of being sapped by an innate tendency to slacking on the part of British workers.

The Lanarkshire steel record demonstrates at once the efficiency and industry of the operatives, but it has deeper significance. In the steel industry as in others we have lagged somewhat behind our competitors in the matter of improved mechanical processes, and in regard to steel manufacture the output in this country has frequently suffered owing to indifferent facilities for tapping. In the case noted the mechanical equipment was of the finest. The moral is obvious. Good workmanship implies good tools. But while it is the duty of manufacturers to install the finest plant, it is incumbent upon the workers to apply their skill and labor in the fullest reasonable measure. It is in the nature of things that our industrial position should be increasingly challenged, but British artisans, if they remain true to a splendid tradition, have nothing to fear from the most formidable competition.

Serious Coal Crisis in England

WASHINGTON, Sept. 23.—"The coal crisis in England and the proposed increase of 6s. ($1.46) per ton for this commodity is having a serious effect on all the industries of Birmingham," says a report from Consul Wilbur T. Gracey at Birmingham. "During the week ending July 26, very little business was done in the buying and selling of iron and steel. Numerous furnaces were stopped and forges and mills were using small quantities of raw material, and there was little call for pig iron.

"The London *Times*, commenting on this situation, says that there is an inclination among finished-iron makers to postpone the settlement of prices until the coal situation becomes clearer, and the matter, in any event, will be very carefully considered. Foreign competition becomes daily more formidable, and while manufacturers consider that at least £2 ($9.73) per ton ought to be added to the selling price to meet the requirements of the situation, they will accept a much less amount to give the foreigner the smallest possible opening for competition."

England Chief Buyer of American Tools

WASHINGTON, Sept. 16.—England continues to be the chief purchaser of American machine tools. In June the exports of metal working machinery to England totaled $1,475,698. France was second with $1,130,486. The following figures compiled by the Bureau of Foreign and Domestic Commerce give the details of the more important exports from the United States by countries for July, 1919:

Countries	Lathes	Other Machine Tools	Sharpening and Grinding Machines	All Other
Belgium	$174,435	$53,284	$43,278	$287,041
Denmark	5,934	18,136	9,931	36,403
France	107,663	235,944	174,644	612,235
Italy	8,136	29,250	8,601	68,577
Netherlands	11,157	7,051	3,900	21,840
Norway	7,412	12,781	1,078	11,338
England	335,390	558,795	100,334	481,179
Canada	27,225	50,285	17,485	86,741
Cuba	2,585	10,880	1,166	7,355
Argentina	22,636	2,168	237	18,273
Brazil	25,757	5,193	2,004	11,554
Chile	736	7,611	4,131	91,160
Spain	22,388	15,206	5,737	66,510
Sweden	19,208	10,402	29,341	66,376
Switzerland	2,343	405	585	24,441

The total value of lathes exported was $840,191; of other machine tools, $1,090,382; of sharpening and grinding machines, $453,545 and of all other kinds, $2,056,701.

Export Association to Discuss Problems

The export problems of the hour will be discussed at the convention of the American Manufacturers' Export Association in New York Oct. 16 and 17. Particular attention will be given to the question of trade with the new nations set up in the peace treaty, and with Russia and the Central Powers. A joint committee of bankers and manufacturers has been considering the present rate of European exchange which has been operating as an embargo against American products, and at the convention will try to formulate some general plan for financing European sales. The Edge bill, which recently passed the Senate to serve as machinery for some such plan, will be discussed. Invitations have been sent to practically every recognized exporter in the United States and every Chamber of Commerce, trade association and foreign banking institution has been requested to appoint delegates.

Speakers include: James A. Farrell, United States Steel Corporation; A. C. Bedford, Standard Oil Co.; E. M. Herr, Westinghouse Electric & Mfg. Co.; W. C. Durant, General Motors Co.; W. L. Saunders, Ingersoll-Rand Co.; George Ed. Smith, Royal Typewriter Co., Inc.; Julius Goslin, Joubert & Goslin Machinery & Foundry Co.; C. K. Anderson, American Wire Fabrics Co.; H. S. Demarest, Greene, Tweed & Co.; W. W. Nichols, Allis-Chalmers Mfg. Co., Inc., and Charles A. Schieren, Charles A. Schieren Co.

RAILROAD BUYING POWER

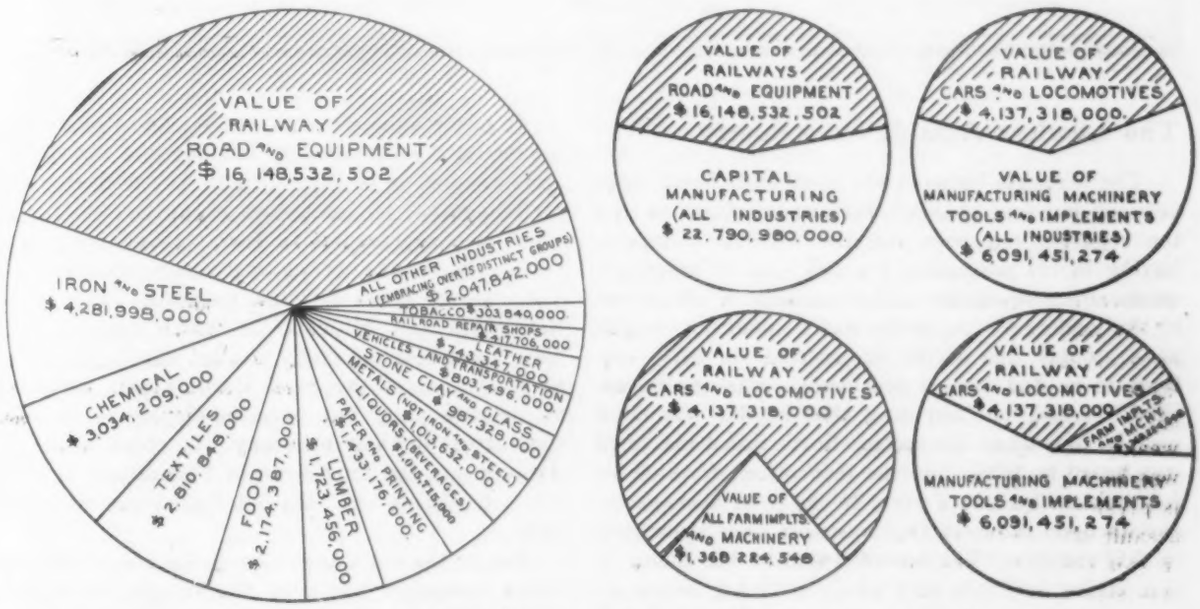
E. B. Leigh Shows Congress Committee by Charts How Important It Is

WASHINGTON, Sept. 23.—Backing up his testimony by graphic charts, E. B. Leigh, president Chicago Railway Equipment Co., emphasized the importance of the purchasing power of the railroads upon the country's industrial prosperity, in a hearing before the House Committee on Interstate and Foreign Commerce. The committee was considering the various proposals to return the control of the railroads to private ownership, and Mr. Leigh testified in behalf of the Railway Business Association, the national organization of the manufacturing, mercantile and engineering concerns which deal with the steam railroads of the country.

"Inasmuch as the railroads of the country constitute its greatest industry, next to that of agriculture, with but one thing to sell, transportation, the greatest single buying agency in the country, the ultimate consumers of everything they buy—their purchases extending substantially throughout almost every department of business, many of them on a tremendous scale—it must be obvious how potent a factor they are in general business.

"As the iron and steel industry has long been recognized as being the truest index of general business conditions, and as prior to 1914 it was reliably estimated that the railroads consumed, directly and indirectly, between 40 and 50 per cent of the iron and steel production of the country, it is manifest that the expansion or restriction of railroad consumption must vitally affect this barometer."

Mr. Leigh also presented an interesting chart of


VALUE OF RAILWAY ROAD AND EQUIPMENT $16,148,532,502
IRON AND STEEL $4,281,998,000
CHEMICAL $3,034,209,000
TEXTILES $2,810,848,000
FOOD $2,174,387,000
LUMBER $1,723,456,000
PAPER AND PRINTING $1,433,176,000
LIQUORS (BEVERAGES) $1,013,632,000
METALS (NOT IRON AND STEEL) $987,328,000
STONE CLAY AND GLASS $803,496,000
VEHICLES LAND TRANSPORTATION $743,347,000
LEATHER $317,706,000
RAILROAD REPAIR SHOPS $303,840,000
TOBACCO $303,840,000
ALL OTHER INDUSTRIES (EMBRACING OVER 75 DISTINCT GROUPS) $2,047,842,000
VALUE OF RAILWAYS ROAD AND EQUIPMENT $16,148,532,502
CAPITAL MANUFACTURING (ALL INDUSTRIES) $22,790,980,000
VALUE OF RAILWAY CARS AND LOCOMOTIVES $4,137,318,000
VALUE OF MANUFACTURING MACHINERY TOOLS AND IMPLEMENTS (ALL INDUSTRIES) $6,091,451,274
VALUE OF RAILWAY CARS AND LOCOMOTIVES $4,137,318,000
VALUE OF ALL FARM IMPLTS AND MACHY $1,368,284,348
VALUE OF RAILWAY CARS AND LOCOMOTIVES $4,137,318,000
FARM IMPLTS AND MCHY
MANUFACTURING MACHINERY TOOLS AND IMPLEMENTS $6,091,451,274

Graphic Comparison of Values of Railroad Property and Equipment with Various Manufacturing Industries

Mr. Leigh pointed out the enormous percentage of the country's business which is involved in railroad purchases and equipment. His own company owns a malleable iron plant at Marion, Ind.; another in Grand Rapids, Mich.; a rolling mill at Franklin, Pa., and a forging plant at Detroit, which was turned over to the Government during the war and is now being dismantled.

"The value of the railroads of the United States, in road and equipment, is $16,148,532,502," says Mr. Leigh, in explaining his charts. "The capital of all of the manufacturing industries of the United States, according to the census of 1914, was $22,790,980,000, while its product was put at $24,246,435,000. The value of the railroad cars and locomotives alone is $4,137,318,000, while the value of the manufacturing machinery, implements and tools of all manufacturing industries is $6,091,451,274. Thus you will see that the value of the railroads, road and equipment, is about 70 per cent as great as that of the capital of all manufacturing industries or, a ratio of about 41 per cent for railroads and 59 per cent for manufacturing industries taken together. The value of railroad cars and locomotives alone represents an amount about 70 per cent as great as that of the value of machinery, implements, and tools in all manufacturing industries, or, again taken together, a ratio of about 40 per cent for the railroads and 60 per cent for manufacturing industries.

"If you compare cars and locomotives with farm machinery and tools, you find that the former are three times as great as the latter.

the relation between railroad purchases and general business prosperity, based on his comparisons from 1901 to 1918, between the state of the railroad purchases each year and the rise and fall of general business conditions as shown by the "Brookmire Business Index."

"It is obvious," concluded Mr. Leigh, "that adequate railroad revenues are essential to adequate railroad purchases; that adequate railroad purchases are fundamentally essential to general business prosperity; that general business prosperity means the prosperity and well-being of the entire nation."

A new publication of the Bureau of Standards, Technologic Paper 116, is entitled "Silica Refractories." It consists chiefly of data obtained in research work on silica refractories (raw materials and finished ware). The experimental work consists of heating tests on silica materials, conducted to determine amount, speed and nature of volume, porosity and specific gravity changes, occasioned in such materials by various heat treatments. Specific gravity determinations on leading varieties of commercial bricks, screen analyses of raw commercial brick mixes, petrographic examinations and minor tests were also conducted. A tentative set of specifications, developed from presented data, for the testing of silica refractories, is given.

The Dover By-Products Coke Co., Dover, Ohio, will add four Roberts coke ovens to its present equipment of 24 ovens, with a view of increasing the daily output of the plant to 400 tons.

ESTABLISHED 1855

THE IRON AGE

EDITORS:

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The Lawless Assault on Industry

The struggle between the open and closed shop, between law and anarchy, between syndicalism and the republic, has been started. Samuel Gompers, having in his possession the red book of sabotage, syndicalism, revolution and bloodshed, of which one of the leaders of the strike was a co-author, might have stopped the strike or assured its early collapse if he had been a real leader with the necessary courage, but anything that he did was done weakly, and when his feeble efforts failed his voice was heard no more, and the federation of which he is president became a party to the most outrageous assault upon industry that has ever been attempted in this country. The record which he has made in this strike dovetails very nicely with his action as to the strike of Boston policemen. He said that the American Federation of Labor did not seek policemen as members, but he permitted the policemen's union to be received into the federation, and his secretary announced that the federation stood squarely behind the strikers even after they had forfeited their jobs.

It is fortunate that right in the beginning of the strike the bold declarations of some of the strike leaders disclose, as the formal statement of demands did not, their real purpose. This might have been surmised by the Foster red book, but Foster said that was written a number of years ago and the intimation was that possibly he had changed his views as to bringing about a revolution, but Fitzpatrick, chairman of the committee of trouble makers, does not intend that any one shall be in doubt as to the present intentions of the strikers. He says:

"We are going to socialize the basic industries of the United States."

That is a very plain, mild statement of a determination to take charge of the industries of the country. It sweeps away the pretense about collective bargaining, shorter hours, living wages, collection of union dues by companies and other demands which have been made, and tells the one big thing that the agitators hope to accomplish—the putting of the steel plants, all mines and many other industries into the hands of the employees.

If other evidence that the strike is not in fact for collective bargaining but for the closed shop were needed, it is furnished by the declaring of a strike against all companies regardless of whether they have representative forms of government or not. The strike is against such companies as Youngstown Sheet & Tube, Colorado Fuel & Iron, Bethlehem and Midvale, in which representative plans have been carefully worked out, just as much as it is against the Steel Corporation, which has no definite plan, but permits employees to select committees in their own way. In other words, the strikers and the un-American Federation of Labor will not tolerate any plan but their own—the closed shop.

One of the most astonishing features of the pre-strike campaign has been the success of the agitators in throwing dust into the eyes of many people, including President Wilson. The President has been quoted as saying in a speech at San Diego last week: "When I find a man who in a public matter will not state his side of the case, I know that his side of the case is the losing side, and that he dares not state it. At the heart of most of our industrial difficulties—and most of you are witnesses of this—lies the unwillingness of men to get together and talk it over."

The President's criticism is a fair one if a company refuses to state its case, and the policy of silence has too often been followed, but Judge Gary and also representatives of independent companies have clearly stated their position in the present controversy and the only unwillingness of public or company officials to confer has been when agitators with whom there could not possibly be agreement asked for conferences. For example, Foster asked Mayor Lysle of McKeesport for an interview with the hope of obtaining permission to make a speech, and the mayor, being fully advised concerning Foster's record, refused to see him, but did see a committee of working men and explain to them why he could not allow public speaking while the city was in such an excited condition. Likewise steel officials believed it would do no good and might do much harm to confer with the Fitzpatrick-Foster committee.

The present strike can not be settled by con-

ferring with men whose teachings are hostile not only to the present organization of industry but to all democratic government in industry and the nation.

Restoration of World Commerce

The commerce of the world stands a long way from being restored to a normal basis. Restoration, of course, does not mean the establishment again of precisely the commerce of before the war, because some conditions are permanently changed and commercial movements will at no time be the same as then in all respects, just as the international exchange of goods in 1913 was different from that of 1903, and that in turn was different from the movement in 1893. World commerce can be normal without being a replica of that before the war.

There are two features in the restoration that must be clearly distinguished from each other and should be considered separately. One is material, the other psychological. It is not sufficient that "conditions" be made suitable for trading. The world is made up of men, and what is in their minds is important. In the United States impatience is sometimes expressed that France and other countries have not settled down to efficient production, as if there were something wrong with the system, or some culprits stood in the way. The people of the United States ought to know better. They have the spectacle of their own returning soldiers, many of whom are distinctly unsettled in their philosophies and uncertain in their habits. Yet those men have been commonly regarded as crusaders, as men who in essence were volunteers on a mission more or less self-chosen. The British and French soldiers had not the same position, there being with them nothing but stern necessity. The reaction afterward must necessarily be the more severe. The mind must recover, and even if complete recovery is certain the lapse of time is necessary. That France, Britain and other countries have not settled down to steady and efficient production is in part psychological.

Both as to the psychology and as to the material conditions, our South was in vastly worse shape after the Civil War than is Europe now, and, furthermore, it was not aided to recover as it should have been, yet it did recover, and recover splendidly. The difficulties were much greater, and there were some that are not present in the European situation.

The exchange market shows, of course, that conditions are not right for normal or regular trading. There has been much urging in certain quarters that exchange should be "stabilized," the meaning being that steps should be taken to produce exchange rates representing a close approach to a gold parity. In much of this preaching there is a confusing of cause and effect. The abnormal exchange rates are due to abnormal conditions, and the abnormal conditions must be removed. It is not sufficient to remove the symptom of the disease. The plain fact—it should be a plain fact—is that in this case removal of the symptom would make the disease worse.

Taking France only, for simplicity, as an example, the situation has been that the French are disposed to import goods from the United States much more than the United States is disposed to import goods from France. The average exchange rate quoted last week was about 8.95 francs to the dollar, which means in one direction a premium of 73 per cent and in the other direction a discount of 42 per cent. That is, by reason of the exchange rate being as it is instead of at gold parity, the French buyer of goods from the United States is made to pay a premium of 73 per cent, while the United States buyer of French goods can get them at a discount of 42 per cent. The exchange rate, therefore, is in the direction of curbing French buying of United States goods and of encouraging United States buying of French goods. Nevertheless, France buys too much from the United States and the United States buys too little from France. If exchange were at par the condition would obviously be very much worse. Thus, if the symptom were removed the disease would be aggravated.

When the remedy of "stabilizing exchange" by artificial means, or direct action, is seen to be inappropriate, it does not follow that attacking the movement of goods is the proper remedy, if that attack, too, be of an artificial character. The exchange market might be made more normal, but exchange is merely a means to an end. The French could establish an import embargo, but it would have to be shown that when goods are needed so badly that a premium of 73 per cent is paid for them they are goods that it is well to do without. Generally speaking, that would be very poor logic. If it were merely a matter of restoring former trade movements, without regard to other considerations, the first thing for the United States to do would be to repeal the dry laws to the extent of letting in French intoxicants, for it is in that connection that the French exports to the United States have suffered the most.

World trade will doubtless be restored to a natural condition, but this will occur chiefly through the establishment of natural conditions in material things and a natural frame of mind for the men who make up the world.

The American Tungsten Industry

A feature of war developments in the American steel and mining industry has been the growth of the tungsten output. It has been somewhat analogous to that of manganese or ferromanganese in particular. Before the war the amount of tungsten ores mined in this country and the quantity of ferrotungsten and tungsten as well as high-speed steels produced was not large. Great Britain and Germany led in high-speed steels and Germany had almost a monopoly of the ferrotungsten market, England even being dependent on her for these alloys.

So great, however, was the need of high-speed tungsten steels for the machining of shells and other munitions that America and Great Britain were forced to develop their own tungsten industries. Quest for such ores soon became eager and recalled almost the feverish hunt for gold in the middle of the last century. Tungsten ores reached a value of over $3,000 per gross ton in the early months of 1916 as compared with a base

price of $270 per ton in 1913. In December, 1918, the value had fallen to about $1,000 per ton.

The finding of American high-grade ores in moderate quantities, together with imports of Chinese and South American ores, led to the production of ferrotungsten and tungsten powder on a large scale. Few realize the extent of this development alone and the incidental or consequent consumption of high-speed steels besides. With the electric furnace on an established basis, it was possible to develop both the ferrotungsten and high-speed steel industry to a high degree. In fact, it was the electric furnace that made this possible.

An example of this striking expansion is afforded by the following facts. In 1918 the amount of 60 per cent tungsten concentrates required to make the ferrotungsten, tungsten powder and acid used in 1918 has been officially estimated at 13,026 tons. The amount of high-speed steel produced in the United States in 1918, nearly all in electric furnaces, has been put at about 23,000 tons with the total amount of all kinds of tungsten steel at nearly 30,000 tons—figures probably never equaled by any country before. In exports also a record was made. In the years 1916, 1917 and 1918 over 4,000,000 lb. of American ferrotungsten and tungsten powder were exported. Before the war these exports were insignificant, the imports being larger.

In this connection the question of a tariff on tungsten ores, alloys and steels, which had been proposed, is important just now. It is a complicated question and opinions vary in the trade as to its feasibility or necessity. Some look upon it as an attempt to protect the producers of low grade ores in this country and point to the ores available from South America and China. In 1918 these amounted as imports to 10,362 tons as against about one-third of this in 1916. As to high-speed steels and a tariff, the opinion seems to prevail that the cost is so high in Europe that protection here is unnecessary and that no fear of competition may at present be entertained. The high rate of duty proposed should certainly be carefully analyzed before adoption is considered.

The Compromise Evil

Many of those who are studying means of settlement of differences between employers of labor and their workers make decided objection to the use of the words "conciliation" and "arbitration." They feel that either word suggests compromise, and they hold that there should be no such thing. If a person feels that more money is due him for his labor, he should not proceed by assuming there will be a splitting of the difference. He should not place his demand at a figure higher than he has any expectation of getting. In many cases that has been the basis upon which labor has brought forward its claims, and the idea has been fostered by the methods of arbitrators, so-called. When a man acts to secure for himself an advance in wages (and the same holds true with reduction of hours) he should be placed in similar position to that of a man sueing to recover the face of a promissory note. If he establishes his case the amount of the note is awarded him; it is that or nothing. If the workman were placed in a position where the issue would be based on whether he were entitled to the wage named by him, no more and no less; if he were to get the advance as stated or no advance at all, much of the present tendency to ask for things out of reason would be curbed. Men would think out their cases carefully and ask truly for what they deem to be their rights.

CORRESPONDENCE

Metric System in Export Trade

To the Editor: Permit me to refer to the illuminating article "Export Trade and the Metric System," by K. G. Martin, published in your impression for Sept. 11, and to endeavor to elucidate the condition which he describes.

Mr. Martin says: "It is a peculiarity of this metric-English question that while the sizes may be largely inquired for in English measurements by certain export areas, the weights will nearly always be specified in the metric system." Elsewhere in his article, Mr. Martin tells us that "certain areas * * * persist in asking for quotations on that (the metric) basis."

Here, we have in a nutshell the case for the metric system in export trade. The investigation of that subject by the Institute of Weights and Measures contained in my report, published by the American Society of Mechanical Engineers, makes clear to anyone who is willing to learn that the call for metric sizes of manufactured products is absolutely negligible—the only call for that system in export trade being its use as a price unit of weight, and of this finding, Mr. Martin's article is ample confirmation. Moreover, according to Mr. Martin, the very export areas which call for metric weights also call for English measurements.

The metric party seem incapable of learning the differences between the units of length to which goods are made and the units of weight by which they are sold, or to realize that while the use of metric units of weight in price quotations is a very simple matter, the adoption of the metric units of length in manufacturing involves a complete reorganization of manufacturing methods from bottom up. In order to avoid the slight amount of office labor involved in making quotations in metric units of weight they propose to introduce a million-fold as much shop labor due to changing shop measurements from the English to the metric basis.

This matter has been explained to the point of tedium, but to no effect on the metric party, which proceeds with its propaganda regardless of all facts that can be placed before them, and of this propaganda, the manufacturing public should take notice. Of its aggressive intrusive character, they have no knowledge, and because of this they are asleep. The question is will they wake up now or as the brewers did, after it is too late.

F. A. HALSEY,
Commissioner, American Institute of Weights and Measures.
New York.

Graphical Presentation of Facts

To the Editor: In THE IRON AGE of March 20 are some very interesting curves on the size of foundry molding sand. These curves interest me because it seems to me that they are plotted in a manner which makes it difficult for the average reader to understand. The independent variable would seem to me to be the size of the sieve mesh and the dependent variable the percentage of sand retained. If this assumption is correct, then common practice would mean that the

sieve mesh would be shown as the abscissae and the percentages as the ordinates.

For the benefit of the joint committee on standards for graphic presentation I should very much appreciate it if I could have the opinions on this matter of your editorial board and the author of the paper in question.

WILLARD C. BRINTON.

Consulting Engineer, New York.

The foregoing letter was referred to F. A. Hayes, the author of the article under discussion, who replies as follows:

To the Editor: Regarding the point that Mr. Brinton brought out concerning the curves used in connection with my article on molding sand, we understand that he believes it would be better to reverse the curves, using the percentages as ordinates and the sieve mesh as abscissae. I think that Mr. Brinton's point is very well taken, and I am pleased to comment upon it.

Mr. Brinton states that the curves are plotted in a manner that makes it difficult for the average reader to understand. You may be interested to learn that I developed these curves for the express use of the superintendent and foremen of a large foundry, they finding the usual method unintelligible and being able at a glance to determine just what was meant by the curves in my presentation. I think the actual experience in this matter more than offsets Mr. Brinton's views as regards the intelligibility of the curves.

While we appreciate that the usual custom is as Mr. Brinton has indicated, there is no real difference in the actual presentation. We believe it perfectly professional to vary the established custom when by so doing the results of a graph to our mind and actual experience present more clearly a series of facts, provided no violence is done to the facts. As you see, the whole thing boils down to a mere difference of opinion as to the ready interpretation of the curves.

F. A. HAYES.

Butler & Hayes, Inc.,
Industrial Engineers, Boston.

Clinton-Wright Stockholders' Meeting

At a special meeting of the stockholders of the Clinton-Wright Wire Co., held at Worcester, Mass., Sept. 17, action was postponed on the proposition to change the name of the company to General Wire Co. The reason for the postponement is a disinclination to abandon the identity of the companies which enter into the consolidation, namely the Wright Wire Co., the Morgan Spring Co., the Clinton Wire Cloth Co. and the Spencer Wire Co., each company having a name of recognized standing in the trade throughout the world. This question will be considered further at an adjourned meeting on Nov. 3.

The capital stock of the Clinton-Wright company was increased from $12,500,000 to $16,000,000, by the authorization of $5,000,000 of 8 per cent non-voting preferred stock of which $1,500,000 will be exchanged for an equal amount of voting 7 per cent preferred stock now outstanding, which exchange is already arranged for.

Charles F. Fairbanks, Lexington, Mass., until the consolidation, head of the Clinton Wire Cloth Co., resigned as a member of the board of directors. Only 9 of the 11 directors had been chosen, and with the created vacancy there were elected to the board Harry W. Goddard, formerly president and treasurer of the Spencer Wire Co.; Frank Kilmer, assistant treasurer and secetary, and George M. Thompson, manager of the Spencer Wire Co. The directors organized with Harry W. Goddard as chairman of the board, Frank Kilmer, as treasurer of the corporation, and George M. Thompson as a vice-president, in charge of plants. A plan to increase the board was deferred for discussion to a directors' meeting, called for Sept. 29. Mr. Fairbanks retires from the board to devote his entire time to the Eastern Specialty Mfg. Co., Boston, which has occupied the former offices of the Clinton Wire Cloth Co.

The other executives of the company, previously elected, are Evan F. Jones, president; John A. Denholm, vice-president, in charge of sales, and George F. Wright, vice-president, assistant general manager to President Jones.

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Commission Holds Secret Hearing on Ferromanganese Case

WASHINGTON, Sept. 23.—The Federal Trade Commission has taken under advisement the complaint filed by the Lavino Furnace Co., Edward E. Marshall and the American Manganese Mfg. Co., Philadelphia, that British manufacturers have been dumping their product in the United States in an "attempt to destroy the industry of the manufacture of ferromanganese in the United States." The hearing was held last week in the office of the commission at which Messrs. Harry DuBois and Edward E. Marshall detailed the charges in the complaints. The hearing, however, was a secret one and no details were made public by the commission. Unless the commission determines to issue a formal complaint, it will not even make an announcement concerning the case.

Publication of *Asbestos*, a monthly market journal devoted to the interests of the asbestos and magnesia industries, was inaugurated with the July number by Secretarial Service, 721 Bulletin Building, Philadelphia.

Safety in Traveling Crane Operation

The causes of accidents in crane operation were analyzed by Eric Zachau, of Manning, Maxwell & Moore, Inc., New York, in an address at a recent meeting of the National Safety Council, Western Pennsylvania Division. Abusive service, imperfect runways, poor crane slings, etc., were the causes assigned to the majority of crane accidents. In most cases, safety, he said, can be promoted by educating the operator to use a crane as a crane and nothing else. This statement was amplified by a review of some of the most common causes of accidents.

Incorrect Alignment and Wheel Wear

"It has been my experience," Mr. Zachau stated, "that frequently the runways, perfect in alignment when new, are not kept up that way and there are no buildings, no matter how substantial the foundation or the structure itself, that will not change shape in time and one of the first places where any displacement will show is naturally the crane runways. Irregularity in the span of a runway, whether too large or too small, means excessive flange stresses on the wheels with consequent breakage, for it must be appreciated that the wheel flanges are not and should not be designed to keep the building together."

Undue strain on truck wheels was also pointed out as being often caused by the unequal wear of the tread of the driving wheels. The circumference of these should be checked at regular intervals. "If one wheel wears faster than the other, and indeed no two wheels will wear alike although of same design and material, one end will travel faster than the other and you have to rely on your flanges altogether to keep the crane square, or nearly square, anyway."

It was Mr. Zachau's opinion that many accidents in connection with crane service can be traced to improper slinging of the load. Except when cranes are handling bulk material in buckets, cradles or equally well suited appliances, the common way of attaching the load to the hook is by some sort of sling, generally made of chain. The same load can be slung on the hook with the same chain in such different ways as to give the chain anything from normal to many times its safe load. Aside from this consideration, the condition of the chains themselves was emphasized as important. "Any metal subjected to frequent stress changes, as is the case with the links of a chain," he said, "will gradually alter its internal structure and crystallize, causing brittleness. No warning is given in the outside appearance of the chain and the only way to prevent accidents due to this cause is by systematic annealing of the chains. The very process of annealing, however, in itself contains an element of uncertainty and I am afraid there is as much injurious annealing done as good. Without going into detail on this subject which is a study by itself, I might suggest as one of the simplest and most reliable methods of annealing, to heat the chain in a lead bath to a cherry red color and then suspend it in air, but not subject to draft, to allow uniform cooling."

Proper Use of Crane

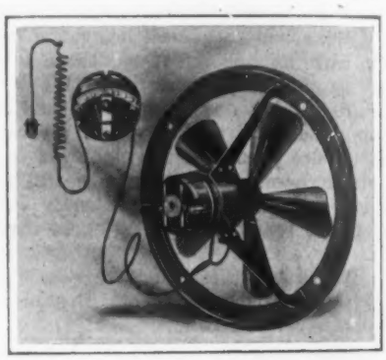
The use of traveling cranes for purposes for which they were not designed such as the pulling of railroad cars or charging buggies, shaking ingots, etc., were pointed out as likely causes of trouble. "It is quite common to pull cars with the crane and such a practice not only is harmful to the ropes but in general imposes altogether foreign stresses on the crane. The breaking of a hitch in this case also is doubly dangerous due to the pendulum swing it will give to the heavy lower block. Indeed the reaction from such a breaking hitch has been known to throw the entire crane trolley off the bridge."

One of the most vital parts of the work of promoting safety, Mr. Zachau stated, should be the careful and systematic inspection of all wearing parts with a view of effecting replacement before breakage occurs. Another factor discussed as a possible source of trouble was the limit switch, and the importance of the selection of the proper switch to suit local conditions was emphasized.

It was Mr. Zachau's conclusion that the really effective means of preventing accidents is not by mechanical safeguards alone, but rather by a combination of such technical appliances and, what he considered even more important, education on the part of the operators to employ good judgment and to be reasonably careful. "Without this element," he said, "a condition might easily be created whereby the workman gets too much safety, so that he feels entirely relieved of any responsibility on his own part. And indeed there have been mechanical safety appliances devised that have proven a menace rather than a preventive. I believe this fact is being recognized and no doubt there will before long be developed a universal safety code, acceptable to all, to take the place of the many different codes at present brought out by various organizations and more or less official bodies. As it is, the crane builder has to meet all sorts of different safety requirements, so that if conscientiously followed, the result would be a different crane for nearly every State."

New 16-In. Ventilating Fan

A 16-in. fan intended for ventilating hot, steamy, close or fume-filled rooms has been placed on the market by the Buffalo Forge Co., Buffalo, N. Y. A speed controller providing six speeds, with cord and plug to go in an ordinary light socket, is furnished with the fan. The motor is totally inclosed, variable speed, dust proof and will operate on 110 or 220 volt, direct or alternating current. The motor is supported by a pressed steel tripod which offers minimum resistance to the flow of the air. The fan has a speed of 500 to 1000 r.p.m., a capacity of 1000 cu. ft. per min., and weighs 20 lb. The motor is rated at about 1/30 hp.



Six Speeds Are Provided by a Controller for This 16-in. Ventilating Fan.

"The Constitution and Microstructure of Silica Brick and Changes Involved Through Repeated Burnings at High Temperatures," is the title of Technologic Paper No. 124 of the U. S. Bureau of Standards. The investigation involves a petrographic microscopic study of test cubes and commercial silica brick, some of which had received repeated burnings by use in kilns. Quartz, cristobalite and tridymite are the main constituents. Small amounts of pseudo-wollastonite and glass are present. Long burning at temperatures slightly less than 1470 deg. C. causes the formation of a large percentage of tridymite. Cristobalite characterizes higher burned brick. Quartz first inverts to cristobalite in the fine grained ground mass and along cracks caused by shattering on heating, and then to tridymite if the temperature does not exceed 1470 deg. C. The lime added in grinding aids more as a flux than as a bond. Most of the cementing action in the burned product comes from the interlocking of the quartz, cristobalite and tridymite crystals.

"Putting Mettle into Metal" is the subject of an interesting booklet issued by the Clark Equipment Co., Buchanan, Mich., manufacturer of Celfor drills. The efforts embodied in the manufacture of its product are explained and well illustrated. Views of the plant, park, greenhouse, theatre, basketball teams and homes constructed by the company for its employees are shown.

Many Loyal as Many Others Strike

Thousands of Americans Refuse to Follow Radical Leaders

Reports Conflict as to Number of Idle Men—Some Plants Operating in Full, Some in Part and Some Are Closed — Amalgamated Association Will Stand by Its Contracts—Catholic Priest Vigorously Denounces Trouble Makers—Very Little Violence at the Beginning of the Struggle

The radical element of the labor unions having succeeded in preventing a postponement of the strike at the steel plants of the country, an attempt was made Monday, Sept. 22, to stop work at all the plants of the United States Steel Corporation and the independent companies throughout the country. Reports are conflicting as to the number of men who went on strike, and it was evident that the radicals were much more successful at some places than at others in inducing workingmen to leave their jobs. A conspicuous example of the refusal of employees to go on strike was that of the Bethlehem Steel Co. at Bethlehem, Pa., where a representative government system is in effect. On the other hand, at the plants of the Cambria Steel Co., Johnstown, Pa., and the Colorado Fuel & Iron Co., Pueblo, Col., where there are also representative plans of government, a large number of the men were not willing to work and the plants were closed. It is reported that 15,000 of the 17,000 employees at Johnstown refused to work. The American Steel & Wire Co. seems to have made very little effort to operate its plants and those at Cleveland and Fairfield, Ala., are idle, the former entirely and the latter in part, but the plant of this company at Worcester, Mass., continues in operation. The number idle at Cleveland is estimated at 40,000 to 50,000. The plants at Columbus, Ohio, were not affected.

Reports indicate that a large percentage of the men at the plants of the United States Steel Corporation at Gary did not go to work. It is claimed that many of them will return in a day or two. One of the bright spots of the situation is the action of the Amalgamated Association in declaring that it will rigidly adhere to contracts, but some members of the association who are not under contract have gone on strike.

Very little violence was reported at the beginning of the strike. The closing of saloons, due to prohibition, is believed to be an important factor in preventing disorder.

Chairman Gary's Letter to Subsidiary Companies

A letter from Chairman E. H. Gary, addressed to the presidents of the subsidiary companies of the United States Steel Corporation, giving the reasons for declining to deal with labor unions, was made public by the Carnegie Steel Co., Sept. 17. The letter, dated New York, Sept. 16, reads:

Not long since I respectfully declined to meet for the purpose of discussing matters pertaining to labor at our various plants a number of gentlemen representing certain labor unions. They claim this furnishes cause for complaint and have stated that they intend, if possible, to prevent a continuation of operations at our mills and factories.

I deem it proper to repeat in a letter what heretofore has been said to you verbally. I entertain no feeling of animosity toward the gentlemen personally and would not hesitate to meet them as individuals, but I did not and do not consider it proper to confer with them under the circumstances.

The declination was made for two reasons: First, because I did not believe the gentlemen were authorized to speak for large numbers of our employees, whose interests and wishes are of prime importance; secondly, because a conference with these men would have been treated by them as a recognition of the "closed shop" method of employment. We do not combat labor unions as such. We do not negotiate with labor unions because it would indicate the closing of our shops against non-union labor; and large numbers of our workmen are not members of unions and do not care to be.

The principle of the "open shop" is vital to the greatest industrial progress and prosperity. It is of equal benefit to employer and employee. It means that every man may engage in any line of employment that he selects and under such terms as he and the employer may agree upon; that he may arrange for the kind and character of work which he believes will bring him the largest compensation and the most satisfactory conditions, depending upon his own merit and disposition.

The "closed shop" means that no man can obtain employment in that shop except through and on the terms and conditions imposed by the labor unions. He is compelled to join the union and to submit to the dictation of its leader before he can enter the place of business. If he joins the union he is then restricted by its leader as to place of work, hours of work (and therefore amount of compensation), and advancement in position, regardless of merit; and sometimes, by the dictum of the union leader, called out and prevented from working for days or weeks, although he has no real grievance, and he and his family are suffering for want of the necessities of life. In short, he is subjected to the arbitrary direction of the leader, and his personal independence is gone. Personal ambition to succeed and prosper is stifled.

This country will not stand for the "closed shop." It cannot afford it. In the light of experience, we know it would signify decreased production, increased cost of living, and initiative, development and enterprise dwarfed. It would be the beginning of industrial decay, and an injustice to the workmen themselves, who prosper only when industry succeeds. The "open shop" will generally be approved by them, for this permits them to engage in any employment, whether they are or are not members of a labor union.

It is appropriate to further emphasize what has been said many times in regard to our employees. Every one, without exception, must be treated by all others justly and according to merit. In accordance with our established custom, one of our workmen, or a number of our workmen from any department, will continue to be received by the management to consider adjustments of any question presented.

It is the settled determination of the United States Steel Corporation and its subsidiaries that the wages and working conditions of their employees shall compare favorably with the highest standards of propriety and justice. Misrepresen-

tations have already and will hereafter be made; unfavorable criticisms may be indulged in by outsiders, especially by those who have little knowledge of the facts; our employees may be threatened and abused in the effort to influence them to join the unions against their own desire; but, whatever the circumstances may be, we should proceed with the conduct of our business in the usual way and should give evidence to our employees that we mean to be fair with them.

Committee's Reply to Judge Gary

The union committee issued the following statement in reply to Judge Gary's letter to the presidents of the subsidiary companies:

In his letter of Sept. 16 to the presidents of the subsidiary companies of the United States Steel Corporation Judge Gary avers that he had two reasons in mind when he refused to meet with the American Federation of Labor committee which called upon him recently requesting a conference for the purpose of presenting grievances of his employees.

First, he did not believe that the committee was authorized to speak for large numbers of the employees.

Second, a conference with the committee would have been treated by them as a recognition of the "closed shop" method of employment.

If these are the real reasons actuating Judge Gary, surely they are not sufficient to plunge the industry into a great labor conflict. Judge Gary presents a false premise and then declares that he will stand or fall upon this false ground.

The committee that waited upon Judge Gary were the selected representatives of the employees. And they requested a conference for the purpose of establishing the principle of collective bargaining and some practical method of redressing grievances.

Judge Gary denied their authority to represent the employees and refused to meet them in conference. The only way left for the employees to convince Judge Gary that the committee does represent the great body of the employees of the United States Steel Corporation is to cease work until the corporation agrees to meet their representatives in conference. This the employees have decided to do on Monday morning, Sept. 22.

It is unfortunate that the employees are compelled to resort to a strike in order to prove the authority of their selected representatives to present their grievances. But as there is no other way, the proof, in the form of a strike, will effectually remove all doubt in Judge Gary's mind.

In the second place, Judge Gary sets up the question of the "closed shop," which has absolutely no basis whatsoever in the present controversy. It is simply dragged in here by Judge Gary as a bugaboo to becloud the real issue.

There is one and only one question at issue, and that is the question of a conference. The employees have exhausted every avenue of approach to the corporation for the purpose of securing a conference, and every avenue has been closed to them. Their last and only hope is to strike, and now the employees declare that they will cease work on next Monday morning until such time as the corporation will meet their representatives in conference for the purpose of establishing humane and reasonable methods of dealing with the very vital problems which affect their lives, their homes, and their future.

JOHN FITZPATRICK,
D. J. DAVIS,
WILLIAM HAMMON,
W. Z. FOSTER.

Contracts Are Bonds of Honor, Declares President Tighe

There has been some confusion as to the attitude of the Amalgamated Association of Iron, Steel and Tin Workers in the steel strike. Conflicting statements have been that the Amalgamated members would and would not go on strike in sympathy with the efforts of the American Federation of Labor. The fact is that the Amalgamated men will strike only in those plants where they are not bound by contracts and wage scale agreements. In some of the steel plants, there are workers who are members of the Amalgamated, but where no wage scale or other working agreements are in effect. These men have been called out by M. F. Tighe, president of the Amalgamated Association, but on the other hand President Tighe has notified all workers in mills having Amalgamated contracts to observe those contracts as "bonds of honor." His statement to the membership of the Amalgamated says:

"Your attention is called at this time to that part of our constitution and general laws which reads as follows:

"'Every member shall interest himself, individually and collectively, in protecting his trade and the business of all employers who recognize, negotiate and are under contract with this association.'

"The object of directing our membership to this particular law bearing on our relations to fair-minded employers is to prevent misunderstandings of any kind during the trying period now before us.

"Our association has entered into contracts with many employers who recognize and treat with the association in its many functions. These contracts are bonds of honor between men, and it becomes us to honor them as such.

"The pledges given by the officials and representatives of both the manufacturers and our association at Atlantic City to hold these contracts inviolate must be ever in the minds of our membership during this scale year.

"The strict observance of these contracts on the part of our membership at this time will bring to them and to the association the credit that comes from fair dealing. It will also demonstrate to the world at large the benefits to be derived from the principle of collective bargaining, embodying the spirit of mutual co-operation.

"Thousands of our members at this very time are preparing to make every sacrifice to secure for themselves the principle of collective bargaining. Let those of our membership who have that prize show by their fealty to that principle the benefits derived by strict adherence to every feature of it.

"Fraternally yours,
"M. F. TIGHE."

Foster Makes Exaggerated Claims

PITTSBURGH, Sept. 22.—At the headquarters of the national committee for organizing the iron and steel workers, Magee Building, Pittsburgh, it was stated Monday afternoon by William Z. Foster, secretary of the committee, that approximately 180,000 steel workers in the United States are out on strike. Of these, it was stated that 15,000 are on strike in Pittsburgh; 9000 at Homestead; 5000 at Braddock; 4000 at Clairton; 12,000 at Duquesne and McKeesport; 4000 at Vandergrift; 5000 at Brackenridge; 1100 at New Kensington; 1500 at Apollo; 3000 at West Leechburg; 12,000 at Donora and Monessen; 15,000 at Johnstown; 4000 at Coatesville; 50,000 in the Youngstown district; 15,000 in the Wheeling, West Virginia, district; 25,000 in the Cleveland district; 7500 at Steubenville, Ohio; 70,000 in the Chicago and Gary districts; 12,000 in the Buffalo district and 6000 at Pueblo, Col.

Secretary Foster said that the national committee felt very jubilant over the results accomplished on the first day of the strike. He predicted that the defection of workers would increase instead of diminish and that more blast furnaces and steel mills would be closed before the end of the week.

On Tuesday the strike organizers will hold a meeting to make plans for continuation of the strike and on Wednesday a meeting of the national committee for organizing the iron and steel workers will be held. Secretary Foster was unwilling to say what arrangements

would be made for the disbursement of strike benefits.

An appeal has been made by the committee to Governor Sproul of Pennsylvania to prevent the state constabulary from interfering with peaceful meetings of the strikers. At Clairton, Pa., Sunday afternoon, the first strike disturbance occurred. The strikers were holding a meeting in defiance of an order issued by Burgess Thomas E. Wilson. Six state policemen on horseback dispersed the strikers without any injuries being reported. Sixteen arrests were made. No disturbances were reported Monday.

At McKeesport, where the strikers have been prohibited from holding public meetings, a vacant lot has been purchased by the national committee in Glassport, just outside the limits of McKeesport, and it is stated that attempts will be made to hold open-air meetings there in defiance of the orders of the mayor of McKeesport.

Secretary Foster admitted to-day that reports as to the number of men out at various plants had been gathered with difficulty owing to the extreme vigilance of the authorities in preventing public gatherings at this crucial time. His figures do not tally with statements of the companies.

Many Idle at Cleveland Plants

CLEVELAND, Sept. 22.—Nearly all the steel plants in Cleveland shut down Monday because of the strike. In nearly every plant sufficient men did not show up for work to attempt operation. About 18,000 are out. The plants shut down include the Newburgh Steel Works, Newburgh Wire Works, H P Works, Consolidated Works, Cuyahoga Works, By-Product Coke Plant and Emma Furnace, all of the American Steel & Wire Co. 9000 out. The men out include: At the McKinney Steel Co.'s four blast furnaces and steel plant, 4000; at the Upson Nut Co. steel plant blast furnace and bolt and nut works, 2500; at the Otis Steel Co., Lakeside plant, 1300; Lake Erie Bolt & Nut Co., rolling mill and bolt and nut works, 1400. The Lake Erie Bolt & Nut Co. has a wage agreement with its employees that does not expire until next July, but in spite of this its employees quit. The four Central blast furnaces of the American Steel & Wire Co. have been down several weeks because of a strike. The steel plants so far not affected are the Union and Empire Rolling Mills, which have Amalgamated Association agreements, and the Riverside plant of the Otis Steel Co. In Canton, Ohio, the United Alloy Steel Corporation, employing 4500 men, shut down its plant, but the plant of the Canton Sheet Steel Co. and the steel plant of the Timken Roller Bearing Co. are being operated. In Massillon the Central Steel Co. and Massillon Rolling Mill Co. suspended operations.

The merchant blast furnaces in this territory that are controlled by Cleveland interests have not been affected by the strike outside of the shutting down of the local furnaces of the McKinney Steel Co.

Foster, the Syndicalist Leader

The report on conditions in the Pittsburgh district, published in THE IRON AGE last week, showing up agitator Foster of the strike committee in his true light, as an advocate of syndicalism, sabotage and revolution by any methods necessary, even including bloodshed, has attracted much attention and liberal extracts have been published by newspapers, especially in New York, by the *World*, *Post*, *Globe* and *Tribune*. It is believed that the disclosure of the radical character of the strike leaders will have a powerful effect upon public sentiment. That Foster is of this opinion is shown by the fact that he has declared at Pittsburgh that THE IRON AGE is "in Dutch with this office" and that nothing will be given to it by Foster or any member of the National committee in regard to the strike. When asked by a representative of THE IRON AGE as to whether the article published last week was correct, he refused to talk.

Theodore M. Knappen, Washington correspondent of the New York *Tribune*, has been on duty in Pittsburgh within the past week and has sent to his paper some articles showing in a very impressive manner the true inwardness of the would-be revolutionary strike. In a telegram published in the *Tribune* Monday, Sept. 22, Mr. Knappen says:

"Foreign steel workers have been told by labor organizers that the general strike of the employees of the steel mills throughout the United States, which is to begin tomorrow, is the revolution. Expressed in the broken English of some buyers at stores in the steel towns, it is:

"'Me pay this week. Next week, no pay. Take.'

"There is no doubt that many of the Slav workers, with hazy but rosy visions of the Russian economic revolution in their minds, think that Monday will mark the beginning of the revolution in America. They join in the strike not for immediate betterment of conditions, but to promote the revolution—not to get more, but to get all.

"In a more profound way and with the longer view, this idea, if his record is any criterion, is in the mind of William Z. Foster, secretary of the international unions' committee of 24, which has organized for the strike and will direct it.

"Foster is conceded to be the brains of the whole campaign to unionize the steel industry, and he is—or was—a thorough-going syndicalist, having a long record as a writer of industrial revolution pamphlets and articles for the radical press and was formerly identified with the I. W. W. movement."

Continuing, Mr. Knappen describes Foster and tells of an interview with him in almost the same language as was used by one of the editors of THE IRON AGE in his report last week. Foster, when asked by Mr. Knappen about the pamphlet "Syndicalism," and as to whether he still is a syndicalist, said, "What's that got to do with the present situation?" He reiterated what he said to the editor of THE IRON AGE, that the question is whether he has the confidence of Gompers. Mr. Knappen adds:

"A short time ago a woman was killed in a conflict of coal miners with deputy sheriffs, which had no relation to the steel controversy. Foster mailed grewsome half-tones of the dead woman's mutilated head with copies of the strike call—without comment.

"Wonder is expressed by all familiar with Foster's economic theories and his ideas of relentless class warfare, with all weapons fair, that he has been permitted to take the leadership of the present strike, where his personality is bound to be conspicuous. The question is asked as to whether he has not already penetrated many of the unions with his radical and militant minority to such a point that it is considered better political management to let him go on rather than try to stop him.

Believed Unions Fear Him

"It is suggested that Samuel Gompers and the conservative international union presidents would rather have Foster working with them than against them, even at the cost of introducing an excessive degree of radicalism into the unions. This line of interpretation of the present situation holds that in doing so the conservative leaders are playing their positions 'safe.' If Foster should win in this strike trade unionism will be tremendously strengthened, even if corrupted. On the other hand, if Foster loses, it will be a knockout for radicalism, it is argued, and the unions will not be

seriously affected. They have been outside the steel industry, and the defeat of the strike would simply leave them outside, with the advantage of being rid of Foster and his subversive doctrines—doctrines alike subversive of the present system and methods of trade unionism as they are of society as now constituted.

Rumors of Padded Ballots

"There are many stories in circulation which suggest that in practice Foster has not been slow in applying his ideas that it is the business of the militant minority to rule. There are reports of strike referendum votes in which one active militant voted 1000 times and others of anti-strike ballots being torn up wholesale. It is noted in this connection that there has never been any public announcement of the actual figures of the referendum vote. The committee simply announced that it showed 98 per cent of the voters in favor of the strike. It is conjectured that the total referendum vote was only a small portion of the nominal union men in the steel industry. If this be true a minority of a part of the steel workers has compelled a strike, which may result in untold suffering and disorganization of industry."

Burning Words from a Catholic Priest

Possibly no man is closer to the steel mill workers of Braddock, Pa., where the Edgar Thomson works of the Carnegie Steel Co. is located, than Rev. P. Molyneux, pastor of St. Brendan's Roman Catholic Church. Father Molyneux in his sermon on Sunday declared: "This strike is not being brought about by intelligent or English-speaking workmen, but by men who have no interest in the community, and who do not have the welfare of the men at heart."

Father Molyneux said to his congregation that he held no brief for any mill or any company or any trust. Within the last two weeks, he said, he has talked with at least 200 mill workers with regard to the strike, all intelligent, English-speaking workmen, some from his own parish and some from outside. "I could not find one instance," he said, "among these 200 men where the man wanted to go on strike. They all stated positively and clearly, on the other hand, that they were well treated and satisfied with conditions.

"There is one thing I have noticed about these strike leaders," continued Father Molyneux, "and that is, with very few exceptions, if any at all, they never had on a workman's blouse in their lives, never went into a mill in a pair of overalls—these men were never seen with the honest sweat of toil on their brows. The tan of brawn is not on their hands. They are a lot of smooth, oily tongued talkers, with a kind of sympathetic whine appealing to you. They are royal gentlemen of leisure; they always wear fine clothes.

"A strike should be the last resort for redress of a grievance, and all other means should be exhausted before men resort to a strike. A strike is a very serious thing and entails very serious consequences upon the family and the home. Most of you remember the Homestead strike in 1892 and you know and realize that the effect of that strike is still felt in the community.

"We have men in this community, who, to my knowledge, for 30 years have left their homes early in the morning in spite of winter's frost or summer's heat, have taken their dinner buckets to the mills and earned a living for their wives and little children. They have been able to clothe their families decently and enjoy many of the comforts of life. Many of them have paid for homes and have been helped in paying for these homes by loans from the steel companies. These men are just as contented today as they have been during the last 30 or 40 years. These honest workingmen should not for a moment be compared with the hoodlums, the cackling geese who come among us trying to tell us what to do.

"Another thing I want to tell you that you may not have thought of is this: You own these mills, these factories. They are yours inasmuch as they give you employment and a means of earning a livelihood. They are yours, inasmuch as these mills pay most of the taxes in this community, which pay for our highways, schools and institutions that shelter the aged, the poor, the insane, the needy, that pay for the hospitals for sick and afflicted. All this is done, in large part, by the mills and factories. Hence you own them, in a way, and when you go to New York, Philadelphia or Cleveland, you are speaking the truth when you say 'our' mills, 'our' homes, 'our' schools. You own them, they are yours as a member of society.

"These fellows, strike leaders, hoodlums that try to keep you from work, live on the bread earned by other people. They don't want to work themselves. They will tell you these mills ought to belong to you. Tell them they do.

"Some of them say the mills ought to be driven out. Drive them out and what will you have? Weeds, stones, rattlesnakes, waste and desolation."

Employees Declare Loyalty

Late last week there was circulated in the New Castle, Pa., works of the Carnegie Steel Co. a set of resolutions in regard to the steel strike, which were freely signed by 85 per cent or more of the employees of this large works. The men signing these resolutions pledged themselves to remain at work, stated they were perfectly satisfied with working conditions, and denounced very strongly the efforts of labor agitators to induce them to go on strike and create dissensions among them. The resolutions adopted and signed so freely by the men are as follows:

The undersigned employees of the New Castle works, Carnegie Steel Co., agree and declare:

First—Outsiders have no right to interfere with our employment.

Second—Paid agitators have no business interfering with us, either in the conduct of our business or in the manner in which we do our work.

Third—Organizers are not working for our benefit, when the result of their efforts is to destroy the pleasant and comfortable conditions that have existed in our departments for years.

Fourth—Foreigners who were unwilling to go to war, but were willing to take the place of our men who helped defend the country, have no standing to agitate matters that tend to destroy the peace of the community and our ability and right to continue in our present employments, which are satisfactory to us.

Fifth—We denounce and resent the efforts of organizers, paid agitators and foreigners to bring about conditions that would not, and could not, be beneficial to us and our families, and declare our intentions to continue at work under present conditions, which we regard as beneficial for ourselves, our families and the community.

Loyal at Worcester

WORCESTER, MASS., Sept. 22.—No employee of the American Steel & Wire Co. in Worcester or New Haven, Conn., and no employee of the Clinton-Wright Co. in any of its works has struck. Labor leaders here state the Steel Corporation has no unionist in New England. The Clinton-Wright Co. men are partly organized, but formally voted not to strike.

Steel Fabricators Support Judge Gary

The Steel Fabricators of the United States, comprising about 100 of the leading producers, have adopted resolutions approving the stand taken by steel manufacturers. The resolution says in part:

Resolved, That the Steel Fabricators of the United States view with considerable disapproval and disappointment the alleged interference by outside influences with the relations existing between the management of the steel industry and their employees, and earnestly hope that those who are re-

sponsible for the policies and production of the steel mills of the United States will consistently stand for the maintenance of the principle of the open shop, wherein American workmen may be provided employment and working conditions mutually satisfactory without the interference and dictation of outside agitators.

The Bridge Builders and Structural Society, also representing the fabricated steel interests, has adopted a resolution similar to that of the Steel Fabricators.

American Steel & Wire Co. Crippled at Birmingham, Ala.

BIRMINGHAM, ALA., Sept. 22.—At noon to-day, the American Steel & Wire Co. was badly crippled, with rod mill only running. About 30 per cent of the men left the Tennessee company's works at Fairfield, Ensley and Westfield. The number of strikers increased as the day went by. Organizers claim that it will be two days before the full effect is felt. Operators will make no statement. No independent plants have been affected here or elsewhere in Alabama. The Tennessee company's plate mill at Bessemer was operating. The Gulf State Steel Co. has no trouble. The independent steel fabricators are not affected. Some men have quit work at Tennessee company's ore mines and by-product works.

Mixed Conditions at Buffalo

BUFFALO, Sept. 22.—A large proportion of the men of the Rogers Brown Iron Co. did not report for work this morning, and this company decided to close down temporarily, awaiting the issue of the strike. The plant is not now producing iron. At the Lackawanna Steel Co. 50 per cent of the men are out, or 3500 to 4000. The union claims it has 70 per cent of the men. The Donner Co. says 100 men are out. The union claims 400. The Buffalo Union and Wickwire companies state conditions are all right, with no strike. The Buffalo Slag Co. has 100 men out.

Independents Suffer Most Severely

PITTSBURGH, Sept. 22.—According to all indications the plants of the United States Steel Corporation, against which the principal strike efforts were directed, have been the least affected by the walk-out of the steel workers. The worst phases of the situation are to be found among the independent plants.

Another peculiar result is that Pittsburgh, which has been the center of strike activities and the headquarters of the organizing committee of the American Federation of Labor, is probably the least affected of any of the steel making centers. Reports from Chicago, Cleveland, Youngstown and the steel towns surrounding Pittsburgh indicate that the partial demoralization which has followed the strike is much worse outside of than in the city of Pittsburgh. The blast furnaces and steel plants of the Carnegie Steel Co., Jones & Laughlin Steel Co. and the Shernberger Works of the American Steel & Wire Co., all within the city limits of Pittsburgh, started out Monday morning with practically full operations. The Crucible Steel Co. was seriously affected at its Crescent Works and in a lesser degree at its Park works, while the Carbon Steel Co. did not attempt to operate its plant Monday morning. The largest plant in the Pittsburgh and nearby districts to shut down completely is the Cambria works of the Midvale Steel & Ordnance Co. at Johnstown, Pa. Fourteen thousand employees of the plant, including the mines and blast furnaces, were paid off on Monday and all of the operations of this company at Johnstown and vicinity were suspended indefinitely.

The Carnegie Steel Co. is worst hit in its blast furnace department. A number of its furnaces have been forced out of blast and a shortage of hot metal may later affect operations in the open hearth and finishing departments. For example, all but two of the Carrie furnaces at Rankin, seven in number, will be banked. These furnaces furnish hot metal to the Homestead Steel Works, and though this plant was running practically 100 per cent on Monday, the outlook for later in the week is uncertain. The Edgar Thomson Works at Braddock was running eight out of 14 open-hearth furnaces and one out of four Bessemer converters on Monday. The Duquesne Works was running almost 100 per cent. The blast furnaces and steel works at Clairton are rather seriously affected, owing to a shortage of foreign labor, but the coke ovens are operating and there are no indications that they will be shut down. Five out of six mills at the Clark Works, Pittsburgh, were operating Monday. Three out of four active blast furnaces at the Ohio Works, Youngstown, have been banked and the open-hearth plant at the same works has been shut down owing to a shortage of foreign labor at the gas house. The Bessemer plant is in operation, however. At New Castle the steel plant and mills are in good shape, but the Rosena furnace has been banked owing to a shortage of foreign labor. The Farrell works is running practically full, but it may be necessary to bank the three blast furnaces.

The upper and lower Union mills in Pittsburgh are practically unaffected. The Lorain plant at Johnstown, Pa., is not affected seriously. Other subsidiaries of the Steel Corporation are affected at some points, but on the whole operations are proceeding at a very fair rate. The National Tube Co. employs 25,000 men at its plants in the Pittsburgh district, and out of this number less than 3500 failed to report for work Monday morning. At McKeesport, where its National works is located, the company has four blast furnaces, open-hearth and Bessemer steel works, pipe and tube mills. Also in the Pittsburgh district are the Continental and Pennsylvania works of this company, and all of these plants were in full operation Monday and only to a slight degree embarrassed by the strike. At Wheeling, W. Va., where its Riverside works is located, the company has two blast furnaces, Bessemer Steel Works and pipe mills, and owing to the threatening attitude of the strikers, it was deemed wise to shut down entirely. This plant will remain idle indefinitely. The Lorain works of the National Tube Co., Lorain, Ohio, which embraces five blast furnaces, steel works and tube mills, was running 100 per cent on Monday.

The American Sheet & Tinplate Co. had no statement to give out regarding conditions at individual plants, but it was stated that operations on Monday were at close to 70 per cent of capacity. It is expected that conditions will improve toward the end of the week.

The American Steel & Wire Co. shut down its Donora works entirely, but is affected only to a slight degree at Shoenberger works in Pittsburgh; the Rankin works at Rankin, Pa.; the Farrell works at Farrell, Pa., and the Braddock works at Braddock, Pa.

The American Bridge Co.'s plant at Ambridge, Pa., is reported to be working full.

The Pittsburgh Steel Co. shut down its entire plant at Monessen late last week owing to a walk-out of its employees. The plant will remain closed indefinitely, including blast furnaces, steel works and finishing department. The Glassport works at Glassport, Pa., was shut down Monday morning, and the company has no plans for resuming work.

The Allegheny Steel Co., Brackenridge, Pa., was

running partially full on Monday. On the first turn 11 out of 15 sheet mills were operating, the plate mill was also in operation and one furnace in the steel plant was running. Later in the day the plate mill was shut down. No attempt was made to start the tube mill, as this is manned almost entirely by foreign labor.

The West Penn Steel Co., also at Brackenridge, reports that on its first turn Monday morning the bar mill was the only division completely shut down. In the sheet department, six out of 10 mills were in operation and this represented about the proportion, 60 per cent, of the employees who reported for work. It was only the common laborers at this plant who obeyed the strike call.

The Labelle Iron Works, Steubenville, Ohio, was shut down completely on Monday. There was no attempt to operate when it was found a large proportion of the men did not report for work. The shut-down includes blast furnaces and the by-product coke plant, as well as all of the finishing mills.

The Wheeling Steel & Iron Co., Wheeling, W. Va., shut down everything except its tin mills. No attempt was made Monday to operate the two blast furnaces, the steel plant, skelp mills or tube mills.

The McKeesport Tin Plate Co., McKeesport, Pa., shut down its 44 hot tin mills last week and later the cold mills and the entire plant were shut down. President E. R. Crawford said that the shut-down was not in any way forced by the strike, but that his concern had accumulated an overstock of black plate. President Crawford said further that about Wednesday of this week the tin house and other finishing departments would be started and later the hot and cold mills would be put on. Most of the company's employees have promised to return to work as soon as needed and the company expects no trouble.

Eastern Mills Not Hard Hit

PHILADELPHIA, Sept. 22.—At the Cambria Steel Co. works of the Midvale Steel & Ordnance Co., Johnstown, Pa., the number of men who reported for work Monday morning was insufficient to justify starting up the plant and it remained idle after the Sunday shut-down. This action was in accord with a notice which had been posted at the works on Saturday, which, in effect, stated that the company had noted the various reports concerning a strike and therefore no effort would be made to start up if what was considered an insufficient number of men came to the plant, also that it would remain closed until such time as the employees chose to return. No disorder was reported and it was hoped that, if the employees chose to remain idle, they would stay away from the works. No one could be found at the company's offices who would venture even an estimate of the number of men who had struck, but it was admitted that the men in Johnstown had answered the strike call in a very general way and that several thousand were involved.

At the Worth plate mill of the Midvale company, at Coatesville, Pa., a few hundred men obeyed the strike call, but the mill, while handicapped, was able to operate in all departments. The Nicetown, Philadelphia, plant of the company was unaffected, all of the employees taking their accustomed places and the work proceeding as usual.

The Midvale Steel & Ordnance Co. in September, 1918, just about one year ago, established for the benefit of its employees a plan of employee representation which, at the time, was referred to as "one of the most important steps taken in the history of the steel industry." It provided for collective bargaining, and the selection of department representatives and committees which, it was hoped, would meet every contingency in case of dissatisfaction on the part of employees. Some of the employees loyal to the plan held a meeting at Coatesville on Sunday at which they deplored the impending strike. When the Midvale plan was adopted, a similar one became effective in the mills of the Lukens Steel Co., also at Coatesville. A few of the employees of the latter company failed to appear for work Monday morning, but here, also, all departments were operated.

One result of the situation at Johnstown was that the sales department of the company stopped taking orders, while pains were taken to make clear to customers that deliveries were dependent on mill conditions. Most of the employees who stayed away from their work were foreigners, it being estimated that of the total number of men out, probably 95 per cent were foreign born and nearly all common laborers. Many of these men appeared to believe that the country was in the throes of some sort of a revolution, perhaps similar to that which occurred in Russia. Official opinion in Philadelphia was that the strike had made a poor start so far as the labor leaders were concerned. It was not believed probable that the small percentage of the total number of men who had struck would be able to sway the larger percentage who showed a willingness to remain at work. The leaders of the strike, those who had incited the non-English speaking worker to stop work, were condemned bitterly, while pronounced admiration was expressed for the stand which Judge Gary has taken.

Reports of freedom from trouble came from the Bethlehem Steel Co., Alan Wood Iron & Steel Co., Eastern Steel Co. and other Eastern mills. The Philadelphia office of the Republic Iron & Steel Co. received instructions early in the day that no orders were to be taken for any of the company's products and that no promises were to be made as to deliveries. Information concerning actual mill conditions was slow in reaching branch offices.

Americans Generally Loyal

PITTSBURGH, Sept. 22.—Rioting broke out in the Pittsburgh district to-night, particularly at the plants of the Carnegie Steel Co. at New Castle, Duquesne and Homestead. It was impossible for the company to give any definite estimate of the blast furnace capacity which has been forced out by the strike. Probably at least half of the 50 furnaces which were in operation are out of blast to-night. All of the Carrie furnaces at Rankin are out of blast. An official of the Carnegie Steel Co. gave out the following statement to-night:

"We are in better shape generally to-night than we were during the day and the situation is pleasing under the circumstances. Our greatest concern is at our blast furnaces, some of which have been banked because of the shortage of common labor, but so far as the skilled element is concerned the defection is practically nil. In every instance where the men are out it is the foreign and unskilled men. Ninety per cent of the American workmen remained at work.

"The Duquesne works is running 100 per cent and the supply of labor for the blast furnaces is better than this morning. The open-hearth plant is running in good shape and the bar mills, while short of men, are running full. At the Edgar Thomson works, the Bessemer converter department continues to operate. Three blast furnaces are in blast and it is expected an-

other will be going before morning. The open-hearths will tap nine heats to-night, but they will have difficulty recharging. The foundry was run in good shape all day, but for the present will not run on night turn. Here as in other plants the American remains loyal.

"The city mills, which were running through the day, are down to-night. These are what is known as the Clark, the Upper and Lower Union mills in the city. The men have been leaving these plants gradually throughout the day, largely through fear of the strikers. The Painter and McCutcheon mills, also city plants, are running full to-night.

"The Clairton works is still able to operate its blooming mill and conditions at the coke plant are better than they were throughout the day. The coke plant is operating better than 50 per cent. Up to to-night, 48 have been arrested in Clairton and there are continual clashes between the State police and the rioters."

Mills which are working under the Amalgamated scale report that they are not having any trouble and do not anticipate any.

The plant of the Whitaker-Glessner Co., Martins Ferry, Ohio, employing 2000 men, is shut down.

The Crucible Steel Co. reports that except for its Crescent and Park plants, Pittsburgh, all plants are working full. There has been no trouble of consequence at Midland, Pa., and the Eastern plants at Newark, N. J., and at Syracuse, N. Y., are unaffected.

"All city furnaces are operating under normal conditions.

"At Homestead it has been necessary to bank all the Carrie furnaces. In all other departments of Homestead, conditions to-night are better decidedly than they were this morning. There has been more or less disorder throughout the day and several clashes between the State police and men congregated on the streets have had a tendency to keep men out of the plant. As the organizers have concentrated their efforts on the Homestead works, the showing made to-night is an excellent one.

"Owing to the fact that Republic Iron & Steel, Brier Hill and Youngstown Sheet & Tube at Youngstown are completely down, the Ohio works has gradually lost ground throughout the day and to-night they are not able to operate in any department. Men coming to work for the night turn at the Ohio works were pulled off of the cars by rioters and 3000 or 4000 persons are gathered around the gates at the present moment. Police protection at this point is inadequate. They were able to operate upper and lower Union mills in fairly good shape throughout the day, but did not attempt to put on the night turn. It is hoped to be able to start some of these mills in the morning, but it is doubtful, as there are thousands of strikers on the streets at these plants.

"Mingo and Bellaire works are down tight and everything there is quiet.

"The New Castle works continue to operate in all departments, although somewhat slowed down by a riot which occurred at the gates to-night. Some of the strikers from the tin mills attempted to break into the New Castle plant and started to pull down the fence. They were met by the police of the company and four of the rioters were more of less seriously injured. As this trouble occurred just at the time of change of turns, some of our men were prevented from entering the plant.

"The North Sharon works was compelled to close to-night on account of large crowds congregating in and about the plant. At Farrell rioting is going on in and about the gates. The Sheet & Tin Plate company and the Steel & Wire company plants were not able to operate throughout the day, but Carnegie plants continued to operate in full until the change of turn this evening. Owing to the rioting to-night, it is impossible to get definite reports from this plant.

"The developments of the day have been largely the instances of disorder occurring at several of our plants. It is still impossible because of this disorder to obtain accurate figures on the men actually remaining away from work."

Many at Youngstown Afraid to Work

YOUNGSTOWN, OHIO, Sept. 22.—Developments to-day justified the assumption that the Youngstown district would be the storm center of the strike of iron and steel workers. With the exception of the Trumbull Steel Co. works at Warren, Ohio, operations were reduced to a minimum. Two big independents, the Brier Hill Steel Co., employing 6500 men, and the Republic Iron & Steel Co., employing 7000 workers, in this district virtually suspended, the Republic company operating only its DeForest sheet mill plant at Niles, Ohio.

Indications to-night pointed to the closing of other plants within a short time. The Carnegie Steel Co., which maintained operations at 50 per cent, to-night announced through District Superintendent James H. Grose that "our plants are slowing down considerably. We have no immediate plans for closing, but will close unless men return to work."

At its Trumbull and Liberty works the Trumbull Steel Co. operated with little interference. The majority of its skilled employees are affiliated with the Amalgamated Association of Iron, Steel and Tin Workers. Preliminary negotiations by the company with organizations of machinists and electricians and newly formed unions of open-hearth employees and unskilled laborers deterred the members from striking.

Schedules at the Youngstown Sheet & Tube Co., employing 13,000 men, which commenced at 50 per cent, started to decline in the afternoon.

All plants of the Sharon Steel Hoop Co. were shut down this morning. The Girard plant of the A. M. Byers Co., Pittsburgh, including 88 puddle furnaces, operated in full as well as the 6-mill sheet plant of the Mahoning Valley Steel Co. at Niles.

Practically 30,000 men were idle to-day in this city as a result of the strike.

The Youngstown Sheet & Tube Co. banked all six blast furnaces at East Youngstown and Hubbard before the strike commenced.

At the Republic Iron & Steel Co. the guide mill at the Brown-Bonnell works operated for half an hour and then suspended. The Bessemer department operated until 9 o'clock, when it also suspended.

The predominating feature of the situation is that a large percentage of the workers, a substantial majority, want to work, but remained away from the mills in order not to court trouble. All plants were picketed by the union, but in spite of this fact there has been no disorder to date.

Ten Thousand at St. Louis Loyal

ST. LOUIS, Sept. 22.—Ten thousand steel workers here are loyal, although a majority are unionized. P. J. Ward, superintendent American Steel Foundries, V. C. Turner, secretary Scullin Steel Co., C. V. Franklin, manager Colonial Steel Co., and officials of the Hirsch Rolling Mills, American Car & Foundry Co., National Enameling & Stamping Co. say: "There will be no trouble here unless national strike cuts off production. Foundries will continue unless raw materials, being unavailable, force lay-off. There is a possibility of reduction of forces about one-half."

Iron and Steel Markets

UNION ISSUE DRAWN

Strike Shutdowns Far From Complete

Favorable Outcome Promising—New Business Temporarily Suspended

Owing to the probability of a strike of press feeders being declared at any time, THE IRON AGE *has found it necessary to go to press Monday night. Hence, in spite of the fact that a large amount of news has been collected by our correspondents, using the telegraph and telephone freely, it is not possible to report as fully as usual the developments in the markets. News of the steel strike is also somewhat curtailed.*

We beg the indulgence of our readers. Our utmost efforts to serve them will be exerted in the following weeks.

An attitude of relief, if not of satisfaction, that organized labor has actually determined to fight out the issue of the closed shop describes the feelings of the leaders of the iron and steel trade. A settlement of the issue which has thus been forced is expected to clarify the general industrial situation. That large numbers have come to feel that the merry-go-round of price and wage advances must be stopped is indicated by a wide approval of the policy of the mills by industrial establishments which consume steel and which appreciate that they would be embarrassed if there should be a long drawn out contest.

Though the scale of plant conditions as Monday wore on was less favorable, no doubt was expressed that the labor organizations would lose. The outstanding facts of the first day of the strike were the substantially full operation of some of the most important of the Steel Corporation's plants and the practically normal operation of a Corporation plant in the vicinity of plants of other ownership which were not put into operation. As the detailed reports elsewhere show and as was expected, the absentees from the plants were largely those of the un-Americanized groups and many of these were apparently remaining away from the plants through fear.

The effect of the strike on the Lake Superior ore movement is not yet clear. Lake vessels have brought down nearly enough ore to meet the requirements up to the opening of navigation next year. The vetoing of the tonnage tax bill by the Governor of Minnesota assures the ore trade that it will not be burdened in that way for at least another year.

With the exception of the selling of some 20,000 tons of foundry grades in Boston territory, the pig iron market has shown almost no activity since it became probable that there would be a strike. Not many merchant blast furnaces have been affected by the strike.

In finished steel, mills will consider orders only for lines on which sales as yet have not been heavy. Business in pipe and sheets is generally refused. The weeks of insistent demand for such products as sheets and bars spell a continuous heavy consumption and an early handicapping of consumer manufacturing operations if the strike is not soon settled.

Pittsburgh

PITTSBURGH, Sept. 22.

Developments of the first day in the general strike of the iron and steel workers have been very disappointing to the labor leaders here and prove that the wild claims made by the labor leaders as to the unionizing of many plants in the Pittsburgh, Youngstown and Wheeling districts were gross exaggeration. A feature of the developments thus far is that the important plants of subsidiaries of the United States Steel Corporation have been very little affected by the strike, and officials of these companies believe the situation with them will be very much better in the next few days than it is to-day. The three largest plants of the Carnegie Steel Co. in the Pittsburgh district, these being in the order named, Homestead Steel Works, Edgar Thomson Steel Works and Duquesne Steel Works, have been affected only to a slight extent. At the Homestead Steel Works every department was on full Monday and practically every department at the Edgar Thomson Works and also at the Duquesne Steel Works. There was slight trouble at the Carrie furnaces among the foreign element, and possible some of these stacks may be banked before the week ends.

The upper and lower Union mills in Pittsburgh were on full on Monday and the three Isabella and the two Lucy furnaces were in blast. The American Sheet & Tin Plate Co. closed down three or four of its sheet and tin mill plants more as a measure of protection to the men and property than anything else, but on Monday this company was operating at about 70 per cent of hot sheet and tin mill capacity. Among plants closed were the Monessen, Pa., Bridgeport, Ohio, and one or two other smaller plants. The American Steel & Wire Co. had serious trouble at only one of its plants in the Pittsburgh district, this being the Donora Works, which was closed, also largely as a protective measure for its men and property. The only plant of the American Bridge Co. in the Pittsburgh district is the Ambridge, Pa., works, and this plant was on full in every department on Monday.

So far shut-downs of plants have been more general among the independent steel companies than with the Steel Corporation. At Youngstown the Republic Iron & Steel Co. and Brier Hill Steel Co. blast furnace, steel works and finishing mills were closed down tight, but the situation at Youngstown was badly complicated by a strike of the men in the railroad yards, who refused to move trains.

In the Wheeling district, the Wheeling Steel & Iron Co. blast furnaces, by-product coke plant, open-hearth steel works and tube and plate mills of the Labelle Iron Works are all closed.

Some merchant blast furnaces in the two Valleys are down, but so far the strike has not affected nearly as many plants as expected and as the labor leaders claimed it would. There has been very little violence so far, nearly all plants being well organized and under protection of local police and the State constabulary.

Events of to-day have emphasized the fact that it would be the policy of the subsidiary companies of the steel corporation and also of the independent steel com-

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton:	Sept. 23, 1919	Sept. 16, 1919	Aug. 26, 1919	Sept. 24, 1918
No. 2 X, Philadelphia‡	$30.60	$30.60	$29.60	$34.40
No. 2, Valley furnace†	26.75	26.75	26.75	33.00
No. 2 Southern, Cin'ti†	**31.35**	31.10	31.10	36.00
No. 2, Birmingham, Ala.†	27.75	27.25	27.75	33.00
No. 2 furnace, Chicago*	26.75	26.75	26.75	33.00
Basic, del'd, eastern Pa.	26.60	26.60	26.60	32.90
Basic, Valley furnace	25.75	25.75	25.75	32.00
Bessemer, Pittsburgh	29.35	29.35	29.35	36.60
Malleable, Chicago*	27.25	27.25	27.25	33.50
Malleable Valley	27.25	27.25	27.25	33.50
Gray forge, Pittsburgh	27.15	27.15	27.15	33.40
L. S. charcoal, Chicago	32.75	32.75	32.75	37.85
Rails, Billets, Etc.,				
Per Gross Ton:				
Bess. rails, heavy, at mill	45.00	45.00	45.00	47.50
O.-h. rails, heavy, at mill	47.00	47.00	47.00	55.00
Bess. billets, Pittsburgh	38.50	38.50	38.50	57.00
O.-h. billets, Pittsburgh	38.50	38.50	38.50	47.50
O.-h. sheet bars, P'gh	42.00	42.00	42.00	51.00
Forging billets, base, P'gh	51.00	51.00	51.00	60.00
O.-h. billets, Phila.	42.50	42.50	42.50	51.30
Wire rods, Pittsburgh	52.00	52.00	52.00	57.00
Finished Iron and Steel,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia	2.745	2.745	2.745	3.73
Iron bars, Pittsburgh	2.75	2.75	2.75	3.50
Iron bars, Chicago	2.62	2.62	2.62	3.50
Steel bars, Pittsburgh	2.35	2.35	2.35	2.90
Steel bars, New York	2.42	2.62	2.62	3.145
Tank plates, Pittsburgh	2.50	2.50	2.65	3.25
Tank plates, New York	2.77	2.77	2.92	3.495
Beams, etc., Pittsburgh	2.45	2.45	2.45	3.00
Beams, etc., New York	2.72	2.72	2.72	3.245
Skelp, grooved steel, P'gh.	2.45	2.45	2.45	**2.90**
Skelp, sheared steel, P'gh.	2.65	2.65	2.65	3.25
Steel hoops, Pittsburgh	3.05	3.05	3.05	3.50

*The average switching charge for delivery to foundries in the Chicago district is 50c. per ton.
† Silicon, 1.75 to 2.25. ‡Silicon, 2.25 to 2.75.

Sheets, Nails and Wire.	Sept. 23, 1919	Sept. 16, 1919	Aug. 26, 1919	Sept. 24, 1918
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Sheets, black, No. 28, P'gh.	4.35	4.35	4.35	**5.00**
Sheets, galv., No. 28, P'gh.	5.70	5.70	5.40	6.25
Wire nails, Pittsburgh	3.25	3.25	3.25	3.50
Fence wire, base, P'gh	3.00	3.00	3.00	3.25
Barb wire, galv., P'gh	4.10	4.10	4.10	4.35
Old Material,				
Per Gross Ton:				
Carwheels, Chicago	$24.00	$24.00	$26.00	$29.00
Carwheels, Philadelphia	24.50	24.50	24.50	29.00
Heavy steel scrap, P'gh.	19.00	19.00	20.00	29.00
Heavy steel scrap, Phila.	18.50	18.50	19.00	29.00
Heavy steel scrap, Ch'go.	18.50	18.50	20.00	29.00
No. 1 cast, Pittsburgh	23.50	23.50	23.50	29.00
No. 1 cast, Philadelphia	25.00	25.00	25.00	29.00
No. 1 cast, Ch'go (net ton)	23.50	23.50	24.00	30.00
No. 1 RR. wrot., Phila.	26.50	26.50	26.50	34.00
No. 1 RR. wrot., Ch'go net	19.00	19.00	19.00	29.75
Coke, Connellsville,				
Per Net Ton at Oven:				
Furnace coke, prompt	$4.60	$4.60	$4.85	$6.00
Furnace coke, future	4.75	4.75	4.12	6.00
Foundry coke, prompt	6.00	6.00	5.50	7.00
Foundry coke, future	5.75	5.75	5.50	7.00
Metals,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York	.....	23.00	24.00	26.00
Electrolytic copper, N. Y.	.....	22.50	23.50	26.00
Spelter, St. Louis	7.10	7.15	7.60	9.30
Spelter, New York	.....	7.50	7.95	9.65
Lead, St. Louis	6.10	6.00	5.75	7.75
Lead, New York	.....	6.25	5.90	8.05
Tin, New York	.....	56.50	56.00	79.00
Antimony (Asiatic), N. Y.	.....	8.50	9.25	13.87½
Tin plate, 100-lb. box, P'gh.	$7.00	$7.00	$7.00	$7.75

panies, where a plant is seriously crippled, to close it down at once and allow it to remain idle until it can be operated without danger to lives of employees or to the property itself.

The situation will likely get worse in the next few days as regards number of men out, but it is firmly believed that within a week many men who have gone out will be applying for work.

Prices are firm and many steel concerns in this district affected by the strike are receiving telegrams and long-distance telephone calls from their customers commending them for refusing the demands of the strikers, and stating they will give them every support they can while the strike lasts.

There will be considerable restriction in output for the next week or two, but after that it is believed that resumption of idle plants will start rapidly.

Pig Iron.—The local market is extremely dull as regards inquiry, as intending buyers are holding off waiting developments in the steel strike, and furnaces are not trying to make sales, not being sure they will be able to operate. Merchant blast furnaces that are now down include Alice and Claire and Sharpsville furnaces at Sharpsville, Pa., also one or two stacks in the other districts. There is some inquiry for foundry iron, but the general market is neglected. The Shenango Furnace Co. was operating its three blast furnaces at Sharpsville, Pa., Monday, and did not anticipate any trouble in continuing to operate. Consumption of pig iron will be affected to some extent by the shutdown of plants due to the strike, but there will also be a decrease in output, so that one will about offset the other. There are no sales of moment to report. Rumors of sales of basic iron at 50c. per ton under the general price are not confirmed here.

Basic pig iron, $25.75; Bessemer, $27.95; gray forge, $25.75; No. 2 foundry, $26.75; No. 3 foundry, $26.25, and malleable, $27.25; all per gross ton at Valley furnaces, and freight rate for delivery in the Cleveland and Pittsburgh districts being $1.40 per ton.

Ferroalloys.—The price of English 78 to 82 per cent ferromanganese is now given as $105 c.i.f., while the price for domestic of that analysis is given as $110 delivered, so that the English and American products are about on a parity in price. A Youngstown, Ohio, interest has been buying freely of Spiegeleisen lately and has taken 5000 tons, or more, prices ranging from $33 to $34, delivered. Low prices are still being made on resale 50 per cent ferrosilicon. The new demand for silvery iron is active and considerable sales have been made for last quarter. We quote 78 to 82 per cent English ferromanganese at $105 c.i.f., and domestic at $110 delivered. We quote resale 50 per cent ferrosilicon at $75 to $80 and 18 to 22 per cent spiegeleisen at $33 to $35 delivered.

We quote 78 to 82 per cent domestic ferromanganese $110 delivered, with a reduction of $1.50 to $1.75 per unit for lower percentages. We quote 50 per cent ferrosilicon at $75, and 18 to 22 per cent spiegeleisen at $32 to $35, delivered. Prices on Bessemer ferrosilicon are: 9 per cent, $47.75; 10 per cent, $49.75; 11 per cent, $53.05; 12 per cent, $56.35. We quote 6 per cent silvery iron, $36.75; 7 per cent, $35.25; 8 per cent, $40.25; 9 per cent, $42.25, and 10 per cent, $44.75. About $3 per gross ton advance is charged for each 1 per cent silicon for 11 per cent and over. All the above prices are f.o.b. maker's furnace, Jackson or New Straitsville, Ohio, which have a uniform freight rate of $2.90 per gross ton for delivery in the Pittsburgh district.

Billets and Sheet Bars.—Several independent steel plants in the Pittsburgh and other districts have been closed entirely and others partly by the strike. These are plants that have finishing mills, which are also partly closed, so that the output of semi-finished steel for the next week or more will be more or less reduced. The steel plants of Steel Corporation subsidiaries have been affected less by the strike than those of the independent concerns. At this writing the steel plants of the Republic Iron & Steel Co. and Brier Hill Steel Co. at Youngstown are down tight. Small plants, such as Allegheny Steel Co., West Penn Steel Co., Carbon Steel Co. and others are also closed entirely or in

part. Some sheet and tin plate mills are down, so that consumption of sheet bars will be restricted. There is practically no inquiry for billets or sheet bars, some negotiations started before the strike took place having been called off. Prices are firm and we quote:

We quote 4 x 4 in. soft Bessemer and open-hearth billets at $38.50, 2 x 2 in. billets at $42; sheet bars, $42; slabs, $41, and forging billets, $51 base, all f.o.b. at mill, Pittsburgh or Youngstown.

Structural Material.—Inquiry was light the past week, some negotiations having been held up on account of the steel strike. The American Bridge Co. has taken 500 tons for new steel buildings for the Union Gas & Electric Co., Cincinnati, and 400 tons of bridge work for the Big Four Railroad at Indianapolis. The Mount Vernon Bridge Co. has taken 550 tons of bridge work for the Pennsylvania Lines West and the Pittsburgh Bridge & Iron Works, 350 tons for a paper mill We quote plain steel at 2.45c., Pittsburgh.

Plates.—The price on sheared plates on any desirable orders has settled down to 2.50c. at mill, Pittsburgh, and this price has been quoted in the past week by the Jones & Laughlin Steel Co. and Carnegie Steel Co. on 5500 tons for the Philadelphia Navy Yard. It is also understood that some desirable contracts for plates taken some time ago at the 2.65c. price have been readjusted to 2.50c., and this will likely be done with others. The demand for plates for oil tanks is active, and from the steel car companies is a little better. Three or four independent plate mills in the Pittsburgh district have been closed by the strike, among these being Allegheny Steel Co. and the Labelle Iron Works. We quote sheared tank plates at 2.50c. to 2.65c. f.o.b. Pittsburgh, but nearly all the business being placed with the mills is at the lower price.

Iron and Steel Bars.—Mills report the demand for steel bars as abnormally heavy and large makers, such as Jones & Laughlin, Carnegie, Cambria and others are practically sold up for the remainder of this year. Several mills are now quoting 2.50c. on steel bars, an advance of $3 per ton over the regular price, but have very little material to spare. Two local mills that roll iron bars report an active demand and are well sold up over last quarter.

We quote steel bars, rolled from billets, at 2.35c. and from old steel rails, 2.45c. Pittsburgh mills rolling iron bars quote at 2.75c., Pittsburgh, plus full freight rate to point of delivery.

Sheets.—Output of sheets has been cut down 25 per cent or more by the strike, some mills being closed entirely and others only partly. Labelle Iron Works, Steubenville, Brier Hill and Republic at Youngstown, Allegheny and West Penn at Brackenridge, are among the sheet mills that are reported as practically closed. The American Sheet & Tin Plate Co. was operating on Monday to between 65 and 70 per cent of its hot sheet mill capacity, and expects to be running at a heavier rate before this week ends. Most large producers of sheets are sold up for the remainder of this year. Prices are given on page 899.

Tin Plate.—Output has been cut down to some extent by the strike. Two or three plants of the American Sheet & Tin Plate Co. are closed entirely, but this company was operating on Monday to about 70 per cent of hot tin mill capacity. The McKeesport Tin Plate Co. which has 44 hot tin mills at McKeesport, Pa., was closed entirely on Monday, but will resume in the finishing departments this week and the hot and cold tin mills will likely start early next week. All the leading producers of tin plate are sold up for this year, and if the strike is prolonged a good deal of tin plate will be carried over into next year. Prices are firm and are given on page 899.

Rods.—The export and domestic demand is active, but local mills are not quoting, as they have very few rods to spare and in addition a few rod mills have been affected by the strike. The rod mills of the Pittsburgh Steel Co., Monessen, Pa., are closed down, but may start in a few days. Prices are firm and are given on page 899.

Wire Products.—New demand is active, but the strike has cut down output in this district to some extent. The plant of the Pittsburgh Steel Co. at Monessen, Pa., is closed entirely and one or two other plants making wire and wire nails are slightly affected. The Donora, Pa., works of the American Steel & Wire Co., one of the largest rod and wire nails mills in the Pittsburgh district, is entirely closed, while the Braddock and Rankin, Pa., plants of this company are slightly affected. The demand for wire and wire nails is active but local makers are well sold up and have practically no material to offer for the remainder of this year. The leading independent mills are still quoting prices about $5 higher than those of the American Steel & Wire Co. Prices are given on page 899.

Hoops and Bands.—Demand for steel hoops is only fair, but for bands is reported quite active. The steel strike has closed two hoop and band mills in this district. Cambria Steel Co. is still quoting $3 per ton advance over the regular price. We quote hoops and bands at 3.05c. Pittsburgh, with the usual extras.

Spikes.—Small spikes are active and the local makers are sold up for two or three months, but railroad and boat spikes are quiet.

We quote standard spikes, 9/16 x 4½ in., at $3.35 base per 100 lb. in carload lots of 200 kegs of 200 lb. each, and small spikes, ⅜ in., 7/16 in. and smaller, at $3.85 to $4 per 100 lb. in carload lots of 200 kegs of 200 lb. each, plus usual extras. Boat and barge spikes, $3.85 to $4 per 100 lb. in carload lots of 200 kegs of 200 lb. each, all f.o.b. Pittsburgh. For less than carloads, 1c. per lb. higher is asked.

Hot-Rolled Strip Steel.—Most large consumers have covered their needs over this year, and mills are well sold up. Prices are reported as holding firm. We quote hot-rolled strips for deep drawing and stamping purposes at 3.30c., Pittsburgh.

Cold-Rolled Strip Steel.—Mills are practically sold up over the remainder of this year, and prices are holding firm. None of the mills in this district making cold-rolled strip steel has thus far been seriously affected by the steel strike. Specifications against contracts are coming in freely.

We quote cold-rolled steel at $5.65 base per 100 lb., f.o.b. Pittsburgh, for 1½-in. and wider, 0.100 in. and thicker hard tempered in coils 0.20 carbon and under. Boxing charge 25c. per 100 lb.

Cold Finished Steel Bars.—Makers report a very heavy demand from automobile builders, while jobbers and other consumers are also building freely. Makers now have more business on their books than any time this year. The method of quoting flat prices on shafting is working out nicely, and there is now very little complaint from either the jobbing trade or consumers. We quote cold finished steel bars at $3.60 per 100 lb. for base sizes, in carload lots, and $3.85 in less than carload lots, f.o.b. Pittsburgh. Extras as adopted last month by the manufacturers are given in full on page 547 of The Iron Age of Aug. 21.

Nuts and Bolts.—Makers report demand from jobbers and consumers as more active than at any time this year, and they are now covering their needs for last quarter, all the manufacturers of nuts and bolts now taking orders for that delivery. One local maker reports his plant is operating at 100 per cent of capacity, the first time in some months, with good orders ahead. Discounts are given on page 899.

Rivets.—No change in prices was made at the conference of rivet makers held in New York on Wednesday, Sept. 17. The new demand is fair, but prices are still being shaded to some extent on desirable orders. We quote large structural and ship rivets at $3.90, large cone head boiler rivets at $4 base, f.o.b. Pittsburgh.

Iron and Steel Pipe.—Mills are congested with orders for line pipe and oil well tubular goods, and are practically refusing all new business being offered. The only plant of the National Tube Co. closed by the strike is its Riverside works at Wheeling, but the pipe mills of the Republic Iron & Steel Co. at Youngstown are also closed. The leading interest is sold up

on line pipe and oil well goods into the first quarter of next year, and none of the independent mills can take more orders for this year and are turning them down. The demand for line pipe and oil well tubular goods is beyond all precedent and the mills say is certain to last over the next two years or longer. Discounts on iron and steel pipe are given on page 899.

Boiler Tubes.—The demand for merchant and boiler tubes is only fair and some shading in prices is still being done. Discounts which are not minimum of the market are given on page 889.

Coke.—So far, operations of beehive coke ovens in the Connellsville districts have not been affected by the strike. The closing down of many blast furnaces is certain to restrict the demand for furnace coke materially, and it may adversely affect prices. Several large inquiries for contract furnace coke are in the market, but it is not likely anything will be done with these while the steel strike lasts. The demand for foundry coke is active, foundries all over the country being fairly busy and not yet affected in the operations by the strike. We quote standard grades of 48-hr. blast furnace coke for prompt shipment for $4.65 to $4.75 and standard grades of 72-hr. foundry coke at $6 to $6.25, all per net ton at oven. For the first time in some months output of coke last week showed a falling off, having been 259,900 tons.

Old Material.—The steel strike has completely paralyzed the local scrap trade and orders are coming in to dealers from consumers everywhere to hold up shipments until the strike is settled. Consumers are not interested at any price and not enough scrap is being sold to establish prices. The market is purely nominal and will likely remain so until the steel strike is settled. We quote nominal prices for delivery to consumers' mills in the Pittsburgh and other districts that take Pittsburgh freight rates as follows

Heavy steel, melting, Steubenville-Follansbee, Brackenridge, Monessen, Midland and Pittsburgh, delivered	$19.00 to $19.50
No. 1 cast for steel plants	23.50 to 24.00
Rerolling rails, Newark and Cambridge, Ohio; Cumberland, Md.; Franklin, Pa., and Pittsburgh	25.00 to 25.50
Compressed steel	18.00 to 19.00
Bundled sheet, sides and ends, f.o.b. consumers' mills, Pittsburgh district	15.50 to 16.00
Bundled steel stamping	13.00 to 13.50
No. 1 busheling	18.00 to 18.50
Railroad grate bars	18.00 to 18.50
Low phosphorus melting stock (bloom and billet ends, heavy plates) ¼ in. and heavier	25.00 to 25.50
Iron car axles	31.00 to 32.00
Locomotive axles, steel	31.00 to 32.00
Steel car axles	28.00 to 29.00
Railroad malleable	20.00 to 20.50
Cast iron wheels	23.50 to 24.00
Rolled steel wheels	22.00 to 23.00
Machine-shop turnings	12.25 to 12.50
Sheet bar crop ends (at origin)	23.00 to 24.00
Heavy breakable cast	21.50 to 21.75
Cast iron borings	15.75 to 16.00
No. 1 railroad wrought	22.00 to 23.00

The Government's Merchant Fleet

WASHINGTON, Sept. 23.—Gradual relinquishment of the Government fleet of merchant vessels is recommended by the executive committee of the National Merchant Marine Association. Of this committee, Edward B. Burling, former general counsel for the Shipping Board, is chairman. Senator Joseph E. Ransdell of Louisiana is president of the organization.

The committee holds that an immediate sale of all the ships is not only undesirable but impractical. Because of this, it has based the policy it recommends upon the idea of a gradual sale of the ships. Pending the absorption of the fleet by private interests, the committee recommends the chartering of the ships to private concerns with options to purchase within a reasonable time. It is urged that such ships as are operated by the Government should be used to develop new trade routes. The smaller vessels, it is stated, should be sold at once without restriction as to purchasers. The views of the organization are in accord with those of John Barton Payne, chairman of the Shipping Board.

Non-Ferrous Metals

The Week's Prices

Cents Per Pound for Early Delivery

	Copper, New York		Tin, New	Lead		Spelter	
Sept.	Lake	Electrolytic	York	New York	St. Louis	New York	St. Louis
17	22.75	22.25	56.50	6.20	5.95	7.50	7.15
18	22.75	22.25	56.00	6.20	5.95	7.50	7.15
19	22.62½	22.12½	56.00	6.20	5.95	7.50	7.15
20	22.50	22.00	.....	6.20	5.95	7.50	7.15
22	22.25	21.75	55.00	6.20	5.95	7.45	7.10
23	22.75	21.75	55.00	6.20	5.95	7.45	7.10

NEW YORK, Sept. 23.

Because of a probability that the pressmen who handle the printing of THE IRON AGE *will go on strike the issue of this week goes to press several hours in advance of the usual time. Therefore, only a condensed review of the metal market can be given.*

All the metals were quiet prior to the steel strike and that event precipitated even greater dullness because of the uncertainty it created in the minds of manufacturers. Tin is likely to be seriously affected by the trouble in the steel trade. It has dropped to 55c. The arrivals are liberal in quantity. In lead and tin very little has been done. Outside sellers of lead are making the market. Zinc is dull and a little weaker. It would not be safe to forecast the course of the metals, but the situation can be summed up by saying that everything depends on labor. Antimony ranges from 8.50c. to 9c. No. 1 virgin aluminum is unchanged at 32c. to 33c.

New Canadian Consolidation

An amalgamation has been made by the Collingwood, Ont., steel plant and the Canadian Western Steel Co., Ltd., with rolling mills at two Western points. The new concern has been incorporated under the name of the Canadian Western Steel Corp., Ltd., and it proposes to start work at the now idle rolling mills at Collingwood, and also to start up the open hearth furnaces. Construction will begin within a few weeks. The corporation will have in operation at an early date three rolling mills, located at Collingwood, Ont., Medicine Hat and Redcliffe, Alta., also a bolt and nut plant at Medicine Hat, Alta., which will enable it to supply the trade both in Eastern and Western Canada.

Another Screw Thread Hearing

The National Screw Thread Commission which recently returned from its trip to Europe in the interest of an international standard for screw threads will hold a public hearing on Monday, Oct. 6, at 10 a.m., in the Engineering Societies Building, 29 West Thirty-ninth Street, New York. This is to provide the opportunity for those interested to consider the report.

The exhibit of the Wadsworth Core Machine & Equipment Co., Akron, Ohio, at the convention of the American Foundrymen's Association, Philadelphia, will include the No. 4 brass bushing core-making machine; the No. 1½ core cutting-off and coning machine; and a demonstration of the No. 1 core-making machine and core cutting-off and coning machine driven by a motor. The Wadsworth "Never Break" core plates and bottom boards will also be shown. The company will be represented by G. H. Wadsworth, president and general manager, and M. C. Sammons, secretary.

Edwin J. Henke has formed the Industrial Welding Co. at Warren, Ohio., with an initial capitalization of $5,000.

Philadelphia

PHILADELPHIA, Sept. 22.

Though the steel strike, when launched, proved to be far from the extensive thing the labor leaders predicted it would be, its general effect was to paralyze the iron and steel market. Not knowing just what they had to face some mills directed their representatives to cease taking orders and under no circumstances to promise definite deliveries against contracts or specifications. Pig iron, quiet before the strike, only became more so.

Plates continue to present the worst feature, the reports of shaded prices being persistent, but despite this a local mill has closed its fourth successive week in which booking exceeded shipments. Several makers assert they will not sell at 2.50c., Pittsburgh. They assert 2.65c., Pittsburgh to be the correct base. Steel bars show considerable strength, one seller reporting having placed a desirable tonnage at 2.50c., Pittsburgh, or 2.745c., Philadelphia, although 2.35c., Pittsburgh, is the generally accepted quotation.

Pig Iron.—Occasional inquiries and sales involving small or moderate-sized lots of foundry iron comprise what activity there is. The market, of course, was quiet long prior to the culmination of the strike talk. In basic and low phosphorus there is nothing doing at all, the mills having of the former, at least, stocks ample for all present needs. In general, it may be said that needs are pretty well covered for the remainder of the year and the furnaces are in a correspondingly comfortable position for that period. As heretofore reported, none is anxious to sell beyond the end of the year because of cost uncertainties.

The following quotations are for iron delivered in consumers' yards in Philadelphia or vicinity, except those for low phosphorus iron, which are f.o.b. furnace:

Eastern Penna. No. 2 X, 2.25 to 2.75 sil.	$30.60 to $31.10
Eastern Penna. No. 2 plain, 1.75 to 2.25 sil.	29.60 to 30.10
Virginia No. 2 X, 2.25 to 2.75 sil.	33.10
Virginia No. 2 plain, 1.75 to 2.25 sil.	32.10
Basic	26.60 to 27.10
Gray forge	27.10
Malleable	30.10
Standard low phosphorus (f.o.b. furnace)	38.00
Copper bearing low phosphorus (f.o.b. furnace)	35.00

Coke.—The market is unchanged at $4.75 to $5 for blast-furnace coke and at $5.75 to $6.25, Connellsville, for foundry. Observers of the market do not look for any considerable decline in view of the labor situation.

Ferroalloys.—There is no activity to test the market. The quotation for domestic standard ferromanganese is $110, delivered. At what price the English makers would sell, since the complaint that they were dumping in this market, is problematical. Some of their representatives say their price is $110, delivered, others that they have no price and must submit all inquiries to their principals. The recent quotation of $95 has been withdrawn, but $105 probably could be done. Spiegeleisen is quotable at $35, furnace, for 18 to 22 per cent.

Semi-Finished Steel.—A fair tonnage of rerolling billets is reported to have been purchased at $40, but the usual quotation for 4 x 4-in. open-hearth rerolling billets is around $42.50. Forging billets are unchanged at $55 and slabs at $45, all delivered Philadelphia.

Plates.—While plates are the dullest of the steel products, one mill reports that it has just closed the fourth consecutive week in which orders booked exceeded its output. Universal plates figure conspicuously in the demand. Considerable difference of opinion exists as to the price, the mill reporting the business alluded to insisting that it is taking business at 2.65c., Pittsburgh, or 2.895c., Philadelphia, while other interests are as insistent that 2.50c., Pittsburgh, or 2.745c., Philadelphia, can be done. It is argued, meanwhile that acceptance by the leading interest of the lower price for large quantities in dealing with the Government does not fix the market for the ordinary consumer. Therefore several of the mills adhere to the 2.65c., Pittsburgh, base.

Structural Material.—All that mills point to as active locally is the demand for miscellaneous lots needed mostly for small work and to replenish fabricators stocks. No building projects of importance are mentioned as existing in this territory. The quotation for plain material is 2.695c., Philadelphia.

Sheets.—Until Monday the sheet situation was but little changed, the mills having enjoyed such a run of demand that they became about filled for the year. Monday brought a slump, over which the makers are naturally not much disturbed, their problem now being to get out orders booked, with strike troubles on their hands. We quote No. 10 blue annealed at 3.795c.; No. 28 black at 4.595c., and No. 28 galvanized at 5.945c., all delivered Philadelphia.

Bars.—Both steel and iron bars are strong, and in the case of the former are active. While 2.595c., Philadelphia, has not been eliminated as a bottom price, it is not easy to find, and 2.745c., Philadelphia, has been done. The mills are not eager for business, especially on the old basis. Bar iron is fairly active, but the supply continues to be lessened by the unsettled strikes in bar-iron mills at Lebanon. Bar iron is quoted at 2.745c., Philadelphia; double refined being 3.745c., Philadelphia.

Old Material.—The uncertain labor situation put a quietus on scrap market activity, the mills doing no bidding pending developments as to labor. Most of them have plenty of material for existing needs and should they buy now they would simply pile what they take, and just now they need their labor elsewhere. No changes in prices are reported, and in the absence of sales the market must be considered nominal.

No. 1 heavy melting steel	$18.50 to $19.50
Steel rails, rerolling	25.00 to 26.00
No. 1 low phosphorus, heavy, 0.04 and under	25.00 to 26.00
Carwheels	24.50 to 26.00
No. 1 railroad wrought	26.50 to 27.50
No. 1 yard wrought	23.00 to 24.00
No. 1 forge fire	14.00 to 15.00
Bundled skeleton	15.00 to 16.00
No. 1 busheling	16.00 to 17.00
No. 2 busheling	13.00 to 14.00
Turnings (short shoveling grade for blast furnace use)	14.50 to 15.00
Mixed borings and turnings (for blast furnace use)	13.00 to 14.00
Machine-shop turnings (for rolling mill and steel works use)	15.00 to 16.00
Heavy axle turnings (or equivalent)	16.50 to 17.00
Cast borings (clean)	15.50 to 16.00
No. 1 cast	25.00 to 26.00
Railroad grate bars	21.00 to 22.00
Stove plate	20.50 to 21.50
Railroad malleable	20.00 to 21.00
Wrought iron and soft steel pipes and tubes (new specifications)	19.50 to 20.50
Ungraded pipe	15.00 to 16.00

Cleveland

CLEVELAND, Sept. 22.

Iron Ore.—The tying up of Lake boats engaged in the transportation of iron ore is threatened. Lake seamen have voted in favor of a sympathetic strike and a strike vote is now being taken by both cooks and firemen. It is stated that no strike will take place for several days at least. While a few men have left the boats, there has been no interruption so far in the ore traffic. The Steel Corporation has brought down a large tonnage of ore this season and would probably not suffer from an ore shortage should shipments be stopped, and nearly all independent consumers have good stocks of ore. Ore firms have been advised that Governor Burnquist of Minnesota has vetoed the tonnage tax bill passed by the State Legislature last week. This bill levied a tax of 5 per cent on ore. Ore prices are as follows:

Old range Bessemer, $6.45; old range non-Bessemer, $5.70; Mesaba Bessemer, $6.20; Mesaba non-Bessemer, $5.55.

Pig Iron.—The market has been very dull the past week. A few sales of foundry iron are reported in lots up to 200 tons to fill out requirements for the remainder of the year. But many consumers are awaiting developments in the steel strike situation before

placing orders. During the past few days furnaces have received numerous requests to hurry shipments. Many consumers apparently are anxious to lay in a stock, fearing that developments in the steel strike situation may result in their inability to get shipments later. We quote, delivered Cleveland, as follows:

Bessemer	$29.35
Basic	25.65
Northern No. 2 foundry, silicon, 1.75 to 2.25	27.65
Southern foundry, silicon, 2.25 to 2.75	34.10
Gray forge	26.15
Ohio silvery, silicon, 8 per cent	45.40
Standard low phos., Valley furnace	$38.00 to 40.00

Finished Iron and Steel.—Many consumers of steel have only small stocks, and should the strike be of any duration, many manufacturing plants will be seriously handicapped if they are unable to secure material. The automobile industry and allied interests probably would be the first to be affected, as these are operating to capacity and have been crowding the mills for shipments. Agricultural implement manufacturers are better situated, having stocks on hand sufficient to last them 60 to 90 days. The probability of the strike had little effect on the market during the past few days. Specifications continue heavy, but probably not in greater volume than during the few previous weeks, and considerable new demand developed. Most mills will continue to take orders for whatever product they are not sold up on, although one independent interest has entirely withdrawn from the market until the strike situation clears up. A heavy demand on jobbers' stocks is expected and the policy of limiting warehouse sales will probably be adopted in order that the immediate wants of as many as possible may be supplied. Warehouse prices are as follows:

Steel bars, 3.27c.; plates, 3.57c.; structural shapes, 3.37c.; bands and hoops, 3.97c.; No. 10 blue annealed sheets, 4.47c.; No. 28 black sheets, 5.27c.; No. 28 galvanized sheets, 6.62c.

Old Material.—The steel strike has brought the scrap market virtually to a standstill. Dealers are making no efforts to effect sales, knowing that were mills willing to buy they would not accept shipments. Practically all mills in this territory have notified dealers to suspend shipments at once. Naturally the market is weak, prices based on late transactions between dealers have declined 50c. a ton on heavy melting steel, and many other grades and turnings are $1 a ton lower. We quote delivered consumers yards in Cleveland and vicinity as follows:

Heavy melting steel	$18.75 to $19.25
Steel rails, under 3 ft	21.50 to 22.00
Steel rails, rerolling	25.50 to 26.50
Iron rails	26.00 to 27.00
Iron car axles	35.00 to 36.00
Steel car axles	33.00 to 34.00
Low phosphorus melting scrap	21.00 to 21.50
Cast borings	13.75 to 14.00
Iron and steel turnings and drillings	9.50 to 10.00
Short turnings (for blast furnaces)	13.25 to 13.50
Compressed steel	16.25 to 16.75
No. 1 railroad wrought	21.75 to 22.25
Cast iron carwheels	21.50 to 22.00
Agricultural malleable	17.00 to 17.50
Railroad malleable	20.50 to 21.00
Steel axle turnings	16.00 to 16.50
Light bundled sheet scrap	14.50 to 15.00
No. 1 cast	23.00 to 23.50
No. 1 busheling	17.50 to 18.00
Drop forge flashings, 10 in. and under	16.25 to 16.50
Drop forge flashings, over 10 in.	13.75 to 14.00
Railroad grate bars	18.50 to 19.00
Stove plate	18.50 to 19.00

Birmingham

BIRMINGHAM, ALA., Sept. 22.

Pig Iron.—Birmingham iron operators, while making no effort to book 1920 business, nor formally opening for that period, made sales of a moderate tonnage during the week ending Sept. 20 for first quarter delivery. As far as can be gathered, the uniform price was $29 on 1.75 to 2.25 silicon, but the business was confined to Southern territory and does not mark what might be done where competition would count. Not enough of this forward business had been done to assure the basis on which large tonnages might be booked. It is understood that a Southern consumer purchased 7000 to 8000 tons of a furnace recently going into operation to be delivered during the last quarter of the year, although it is not proposed to melt it until 1920. The basis is reported to have been the current market price, $28. There has been no letting down of the tone of the market, but the inquiry has been for small tonnages for immediate delivery, the consumers apparently holding off pending the outcome of the steel strike. However, no one was worried and there was no disposition toward pessimism. Makers are not inclined to hurry the trade and seem bent on keeping the market firm and steady. The general impression in the Birmingham district on the eve of the steel strike was that the strikers would lose and that the Birmingham district would feel it less than any other. Incompleteness of organization in this section was openly admitted by the organizers. The car situation worries a good deal. One interest piled 10,000 tons during the month, others in proportion. All finishing steel works were operating around maximum at close of week and the Southern melt both of iron and steel has been steadily increasing. The Woodward Iron Co. is about ready to blow in its fifth stack. Furnace operations as a rule are excellent and high grade silicon irons are being turned out plentifully. We quote per gross ton f.o.b. Birmingham district furnaces as follows:

Foundry, silicon 1.75 to 2.25	$28.00
Basic	27.00

Cast Iron Pipe.—Sanitary pipe shops are so crowded with business for the rest of the year that they are out of the market for that period. Pipe is being loaded while still smoking from the tarring process. Every shop reports the same conditions. Water and gas pipe plants are in a dilemma. Some of them are begging others to take some of the small size business offered, but all are in the same shape in that respect. There is an unprecedented demand for small sizes.

Coal and Coke.—There is well-nigh a famine in 72-hr. hand-picked foundry coke, which brings $9.50 easily for spot shipment and $9 on contracts. Furnace coke is also not up to the demand. The 48-hr. make is selling for $7.50.

Old Material.—Scrap dealers report that the market has again quieted down owing to the steel strike, but that a fair business was done for a couple of weeks. Prices now quoted are firm with small consumers paying a trifle over quotations for some grades. We quote per gross ton f.o.b. Birmingham district yards, prices to consumers, as follows:

Steel rails	$18.00 to $19.00
No. 1 heavy steel	17.00 to 18.00
Cast iron borings	10.00 to 10.50
Machine-shop turnings	10.00 to 10.50
Stove plate	20.00 to 21.00
No. 1 cast	23.00 to 24.00
Carwheels	23.00 to 24.00
Tramcar wheels	22.50 to 23.00
Steel axles	25.00 to 26.00
No. 1 wrought	18.00 to 19.00

St. Louis

ST. LOUIS, Sept. 22.

Pig Iron.—The foundries are buying pig iron as freely as furnace conditions permit, but are, seemingly, not able to get all they want on deliveries desired. In a considerable number of instances, furnace representatives have been unable to quote because of inability to comply with delivery conditions and this has narrowed the market somewhat for the foundrymen who are paying the price asked without much comment and are apparently pleased that the prices made are not higher. No contracts are being made for delivery beyond Jan. 1, 1920, and foundrymen are becoming somewhat anxious over this state of affairs, as they are able to see considerable business ahead which they want to take, but are a little afraid to do so because of the uncertainty as to what iron will cost beyond the end of the year. All transactions are in tonnages ranging below 500 tons.

Coke.—Current buying of coke is confined to needs developed by business in excess of estimated fuel needs when coke contracts were made. The advances in coke are being paid, but contracts for deferred deliveries

are not in large number. By-product coke are sold up so far as local and near-by plants is concerned.

Finished Material.—Buying of finished iron and steel has been as free as mill representatives would permit during the past week, but transactions have been made with clear understanding as to the possibilities involved in the proposed strike. The local building strike, which is affecting a number of large construction contracts, has disturbed conditions somewhat, but the needs for new space are pressing construction work wherever possible and in consequence buying of material is as free as sellers permit. Movement out of warehouse has been very satisfactory at these prices:

Soft steel bars, 3.44c.; iron bars, 3.44c.; structural material, 3.54c.; tank plates, 3.74c.; No. 8 sheets, 4.59c.; No. 10 blue annealed sheets, 4.64c.; No. 28 black sheets, 5.69c.; No. 28 galvanized sheets, black sheet gage, 7.04c.

Old Material.—The scrap market continues soft because of the steel strike situation and the dealers are buying only when the price is such as to asusre profitable handling, including carrying charges. Consuming interests are taking very little material at present beyond contracts entered into some time ago and are expected to proceed cautiously until the labor situation becomes more clear. For old material we quote dealers' prices f.o.b. customers' works, St. Louis industrial district, as follows:

	Per Gross Ton	
Old iron rails	$22.50 to	$23.00
Old steel rails, rerolling	26.50 to	27.00
Old steel rails, less than 3 ft	21.50 to	22.00
Relaying rails, standard sections, subject to inspection	38.00 to	45.00
Old carwheels	24.00 to	24.50
No. 1 railroad heavy melting steel	18.50 to	19.00
Heavy shoveling steel	16.50 to	17.00
Ordinary shoveling steel	15.50 to	16.00
Frogs, switches and guards, cut apart	18.50 to	19.00
Ordinary bundled sheets	12.00 to	12.50
Heavy axle and tire turnings	13.75 to	14.25
Per Net Ton		
Iron angle bars	$19.00 to	$19.50
Steel angle bars	16.50 to	17.00
Iron car axles	30.50 to	31.00
Steel car axles	28.50 to	29.00
Wrought arch bars and transoms	22.50 to	23.00
No. 1 railroad wrought	18.00 to	18.50
No. 2 railroad wrought	17.00 to	17.50
Railroad springs	17.00 to	17.50
Steel couplers and knuckles	17.00 to	17.50
Locomotive tires, 42 in. and over, smooth inside	17.25 to	17.75
No. 1 dealers' forge	16.00 to	16.50
Cast iron borings	11.00 to	11.50
No. 1 busheling	16.50 to	17.10
No. 1 boiler, cut to sheets and rings	12.50 to	13.00
No. 1 railroad cast	24.50 to	25.00
Stove plate and light cast	21.50 to	22.50
Railroad malleable	16.50 to	17.00
Agricultural malleable	16.10 to	16.50
Pipes and flues	14.50 to	15.00
Heavy railroad sheet and tank	13.50 to	14.00
Railroad grate bars	18.50 to	19.00
Machine-shop turnings	8.50 to	9.50
Country mixed	14.00 to	14.50
Uncut railroad mixed	15.50 to	16.00
Horseshoes	20.00 to	20.50

Boston

BOSTON, Sept. 22.

Pig Iron.—About 20,000 tons of iron was sold last week in New England by local agents, the record tonnage for many weeks. Over half of this business was for next year's delivery. A significant feature was the price at which much of this was placed for next year—$29, furnace, for 2.25 to 2.75 silicon iron—a price decidedly low in view of universal reports of rising costs of making because of higher coke and labor. The outlook now is that the predictions made a month ago of much higher iron will not prove true unless some radical unforeseen factor enters. The steel strike may be that factor. Among the buyers were some of the foundries of leading textile interests which are placing orders reaching into the thousands of tons and inquiring for more. The fact that one leading Buffalo producer is selling No. 2X iron for 1920 at $29 is bringing others, both in this and other districts, down in their quotations. One seller disposed of 11,000 tons last week. The heaviest lots were to textile interests, among which were included tonnages of 4000, 1500 and 600; a malleable iron maker took 1000 tons; jobbing foundries took several lots of 300 tons, with one 600-ton order; a stove maker bought 600 tons. Another seller placed about 5000 tons last week, all for this year, the following representing some of the grades, districts and silicon content: 400 tons eastern Pennsylvania iron, 1.75 to 2.25 sil.; 500 tons of Virginia iron, 2.75 to 3.25 sil.; 500 tons of Virginia iron, 2.25 to 2.75 sil.; 200 tons of malleable, 1500 tons of eastern Pennsylvania iron, sil. 2.25 to 2.75; 1500 tons of eastern Pennsylvania iron, sil. 2.75 to 3.25; 100 tons of eastern Pennsylvania iron, sil. 2.75 to 3.25, the latter to be consumed in Connecticut, while the other tonnages mentioned will be shipped to points in Massachusetts. A valve manufacturer bought 500 tons of 1.75 to 2.25 iron. One sale of 4 to 5 per cent silicon iron, to the amount of 500 tons, was made for $33, furnace. In the opinion of veteran salesmen, this week will see the end of the present buying movement, due largely to the fact that furnaces are becoming sold up and not seeking business. Iron has been somewhat plentiful for $29, furnace Buffalo, for No. 2X, and for $30, furnace eastern Pennsylvania, though prices a dollar higher are very common.

Eastern Pa., No. 2 X (silicon 2.25 to 2.75)	$32.90
Eastern Pa., No. 2 plain (silicon 1.75 to 2.25)	31.90
Buffalo No. 2 X (silicon 2.25 to 2.75)	32.90
Buffalo No. 2 plain (silicon 1.75 to 2.25)	31.90
Virginia No. 2 X (silicon 2.25 to 2.75)	35.70
Virginia No. 2 plain	34.70

Old Material.—New England yards are filled with scrap, there never having been a greater abundance. But the uncertain strike situation is still holding buying down to a minimum. Prices remain where they are on most items chiefly because they are nominal. It is felt that when steel consumers become active purchasers again, prices will drop temporarily, but will soon pick up and advance over those of to-day. Cast scrap is fairly active and is being shipped to New England from as far as New York and vicinity. No. 1 machinery continues to bring $28.50, delivered. Not even local steel users are inquiring for old material. Borings and turnings continue to make their steady movements from machine shop to dealer, thence direct to blast furnaces. We quote dealers' buying prices, delivered to their New England yards, per gross ton as follows:

No. 1 heavy melting steel	$15.00 to	$16.00
No. 1 railroad wrought	19.50 to	20.00
No. 1 yard wrought	18.00 to	19.00
Wrought pipe (1 in. in diameter, over 2 ft. long)	15.50 to	16.00
Machine-shop turnings	10.50 to	11.00
Cast iron borings	11.00 to	11.50
Heavy axle turnings	11.50 to	12.00
Blast furnace borings and turnings	9.50 to	10.00
Forge scrap	10.50 to	11.00
Bundled skeleton	10.50 to	11.00
Steel car axles	22.00 to	23.00
Carwheels	24.50 to	25.00
Machinery cast	24.50 to	25.50
No. 2 cast	22.00 to	23.00
Stove plate	19.50 to	20.00
Railroad malleable	17.00 to	17.50
Rerolling mills	20.00 to	20.50

New York

NEW YORK, Sept. 22.

Pig Iron.—Business has taken a decided slump, consumers apparently awaiting the outcome of the steel strike. Moreover, more furnaces have stopped quoting for either this or next year and iron is constantly more difficult to buy. One seller representing two furnaces which have been down since June 1 on account of strikes and who has sold much iron for next year, is worrying over his ability to deliver it. As an indication of typical prices, 1500 tons of Buffalo iron, silicon 2.25 to 2.75, was sold recently to a foundry along the Hudson River, half to be delivered this year and half the next, this year's price being $29, furnace, and that for next year being reported $2 higher. Except in one instance the present steel strike has not extended to merchant blast furnace operators, but in the event that it does, higher iron is expected. The chief business of late has been in foundry iron and

malleable and these have been sold in only small tonnages.

No. 1 foundry, silicon 2.75 to 3.25	$30.80 to $32.80
No. 2 X, silicon, 2.25 to 2.75	30.80 to 31.80
No. 2 plain, silicon 1.75 to 2.25	29.80 to 30.80
No. 2 X, Virginia, silicon, 2.25 to 2.75	32.40 to 35.40

Finished Iron and Steel.—Few offers from consumers are being given serious consideration by selling agencies. What business has been taken is largely by mills which do not seem to be seriously threatened with strike curtailment of operations. Notable in this class is 3500 tons of plates sold by one mill for export. In spite of the uncertain outlook quite a fair tonnage of structural work was put under contract, some of the awards being noted below, and the following new work is now up for consideration:

	Tons
Extension of cannon shop, Watervliet Arsenal	235
Masonic Hospital, Utica	250
Armour Co. fertilizer plant, Chrome, N. J.	250
Pier, Erie Basin	250
Building for John T. Wilson, Richmond, Va.	350
Nurses' Home, Williamsburg Hospital	300

Awards include the following: Shipley Construction Co., Brooklyn, 350 tons, to Post & McCord; paper mill, Fitchburg, Mass., 350 tons, to Eastern Bridge & Structural Co.; League of Political Education, Forty-third Street, New York, 1000 tons, to A. E. Norton; Orange Memorial Hospital, 200 tons, to Hay Foundry & Iron Works; Strauss & Co. building, New York, 350 tons, to Passaic Steel Co.; Kelly-Springfield Tire Co., New York, 550 tons, to Hinkle Iron Co.; office building, Madison Avenue and Forty-sixth Street, New York, 800 tons, to Hedden Iron Construction Co.; breaker, Scranton, Pa., 1300 tons, to fabricator whose name has not been ascertained.

We quote as follows for mill shipments: Bar iron, refined grade, 2.77c.; double refined bar iron, 3.77c.; soft steel bars, 2.62c.; shapes, 2.72c.; plates, 2.77c.; all New York.

Cast-Iron Pipe.—Two thousand tons of 16-in. pipe will be let to contractors by the city of East Hartford, Conn., on Oct. 2. Prices are holding up well, with no shading and with a decided tendency to charge higher than the present market prices. In fact, one fair-sized sale was made recently at $2 higher than the figures recorded below. We quote 6-in. and heavier, $54.30; 4-in., $57.30, with $2 additional for class A and gas pipe.

Old Material.—Practically the only materials sold are steel in charging box shape and borings and short turnings for blast furnace use, both items for Bethlehem; and stove plate and clean cast iron borings for Harrisburg. Wrought scrap used in rolling mills is also fairly active. Dealers console themselves with the thought that in compensation for the present absence of activity there will be an enormous volume of sales when the labor situation becomes settled. Dealers are, therefore, still content with piling material in their yards to await the expected time of big movement. Prices which brokers and dealers are paying per gross ton, New York, follow:

Steel rails, 3 ft. or under (or equivalent)	$15.50 to $16.00
Heavy melting steel	14.50 to 15.00
Rerolling rails	20.50 to 21.00
Relaying rails, nominal	41.00 to 42.00
Steel car axles	25.00 to 26.00
Iron car axles	32.00 to 33.00
No. 1 railroad wrought	23.50 to 24.00
Wrought iron track	18.00 to 19.00
Forge fire	10.50 to 11.00
No. 1 yard wrought, long	18.50 to 19.00
Light iron	6.00 to 7.00
Cast borings (clean)	11.50 to 12.00
Machine-shop turnings	11.00 to 11.50
Mixed borings and turnings	10.00 to 10.50
Iron and steel pipe (1 in. min. diam., not under 2 ft. long)	15.00 to 15.50
Stove plate	17.50 to 18.00
Locomotive grate bars	18.50 to 19.00
Malleable cast (railroad)	16.00 to 16.50
Old carwheels	21.50 to 22.00

Prices which dealers in New York and Brooklyn are quoting to local foundries, per gross ton:

No. 1 machinery cast	$24.50 to $25.00
No. 1 heavy cast (columns, building materials, etc.), cupola size	23.50 to 24.00
No. 1 heavy cast, not cupola size	16.50 to 17.00
No. 2 cast (radiators, cast boilers etc.)	17.50 to 18.00

Cincinnati

CINCINNATI, Sept. 22.

Pig Iron.—No blast furnaces of steel mills in southern Ohio have been affected by the steel strike, all furnaces are operating, running full time, but being handicapped to some extent on account of slow coke shipments that include those from by-product ovens. Pig iron buying is practically at a standstill, awaiting developments in the labor situation. A few small contracts for last quarter Southern foundry iron have been made recently. A few selling agencies have received a tentative Southern price list for first and second quarters, based on $30, Brimingham, 1.75 to 2.25 silicon, although books have not yet been formally opened. Northern furnaces are holding up making any figures for that delivery. The local machinists' strike, expected to affect several plants, did not take place to-day. The Cincinnati Screw Co., where the strike was called three weeks ago, is operating with 98 per cent of its old employees. Employees of several machine tool plants voted Saturday against a strike. Heavy melting steel and steel rails:

Based on freight rates of $3.60 from Birmingham and $1.80 from Ironton, we quote f.o.b. Cincinnati:

Southern coke, silicon, 1.75 to 2.25 (base price)	$31.35 to 31.60
Southern coke, silicon, 2.25 to 2.75 (No. 2 soft)	32.60
Ohio silvery, 8 per cent silicon	42.05
Southern Ohio coke, silicon, 1.75 to 2.25 (No. 2)	$29.10 to 29.60
Basic Northern	27.55 to 28.55
Standard Southern carwheel	51.60
Malleable	29.05

British Iron and Steel Market

Molders' Strike — American Business in Skelp, Bar Iron and Discard Steel—Lorraine Prices

(*By Cable*)

LONDON, ENGLAND, Sept. 22.

The strike of iron molders has been called, and it is general, except for those having a Scotch connection. Demand is for increased wages.

Some pig iron makers are stocking iron owing to railroad congestion, together with the better working of furnaces. An advance in prices is regarded as necessary if the threatened increase in railroad rates matures. Italy is inquiring for hematite iron.

A limited company is being formed for the joint purchases of Bilbao Rubio ore by Bolckow, Vaughan & Co., Ltd., Sir B. Samuelson & Co., Ltd., Bell Brothers, Ltd., William Whitwell & Co., Ltd., and Linthorpe-Dinsdale Smelting Co., Ltd.

The coal output for the first week of September is 4,509,000 tons, which compares with 4,355,000 tons for the last week of August and 3,989,000 tons for the week preceding that.

Demand for plates continues heavy and tin plates are strong. The output of the latter is still restricted owing to the drought in Wales. There are fewer sellers of galvanized sheets and these are mostly asking about £31 base or 10s. above the general market quotation a week ago. Further business is pending in American skelp and bar iron. British owned American shell discard steel has sold for £6 5s. delivered in the Midlands (or $26 with exchange figured at $4.16 to the pound sterling). American soft billets on resale have been done at about $54 delivered at consumers' works.

Lorraine prices have advanced, being now as follows, f.o.b. Antwerp: Foundry iron, 226.5 fr. ($25.60, based on exchange at the rate of 8.85 fr. for $1); sheet bars, 445 fr. ($50.30); billets, 415 fr. ($46.80); slabs, 425 fr. ($48); blooms, 415 fr. ($46.80); rails, 545 fr. ($61.60); beams, 520 fr. (about $2.70 per 100 lb.).

A recent sale of Lorraine basic iron was made at

£7 15s., c.i.f. Glasgow ($32.25). All French steel deliveries are greatly in arrears.

The Skoda Works shareholders are to vote upon the nationalizing proposal.

We quote per gross ton, except where otherwise stated, f.o.b. makers' works, with American equivalents figured at $4.14 for £1, with the reservation that most makers have temporarily withdrawn prices:

	£	s.	d.	£	s.	d.		
Pig Iron:								
East coast hematite	10	0	0		.....		$41.40	.....
West coast hematite	10	4	6		.....		42.33	.....
Scottish foundry, No. 1	10	0	0	to 10	10	0	41.40 to	$43.47
Coke, furnace	2	8	0	to 2	10	0	9.93 to	10.35
Coke, foundry	2	13	0	to 3	6	0	10.97 to	13.66
Billets	15	0	0		.....		62.10	.....
Tin plate and sheet bars	14	0	0		.....		57.96	.....
Rails, 60 lb. and upward	16	10	0		.....		68.31	.....
							Cents per lb.	
Bars, ⅜ to 3 in.	20	5	0		.....		3.74	.....
Beams	17	10	0		.....		3.23	.....
Plates, ship, bridge and tank	18	5	0		.....		3.37	.....
Plates, boiler	22	10	0		.....		4.16	.....
Bar iron, stand. crown	22	0	0	to 23	5	0	4.06 to	4.34
Galvanized sheets	30	10	0	to 31	0	0	5.63 to	5.72
Black sheets, 24-gage	24	15	0		.....		4.57	.....
Tin plates, 14 x 20, coke, 112 sheets, 108 lb., f.o.b. Wales.	1	16	6		.....		$7.55	.....

IRON AND INDUSTRIAL STOCKS

Values Decline as Steel Strike Approaches, but Rally on Actual Strike News

NEW YORK, Sept. 22.

The market developed irregular tendencies last week as the probabilities of a postponement of the steel strike dwindled. Speculative leaders lost their vigor and the market became largely a professional affair. Lack of buying rather than a marked pressure of selling was the apparent cause of recessions. Thirty standard industrial stocks showed a net loss of about 3½ points for the week. With the strike an actual reality on Monday, and the reports more favorable than had been anticipated, the general list rallied—the coppers fractionally, the steels from one to two points.

The range of prices on active iron and industrial stocks from Tuesday of last week to Tuesday of this week was as follows:

Allis-Chalm. cm.	43¼ - 48½	H.-W. Refr. com.	— -102
Allis-Chalm. pf.	95 - 96½	Int. Har. com.	129 -133¼
Am. Can' com.	55 - 59⅝	Int. Har. pf.	115½-116
Am. C & Fd. cm.	130⅝-136	La Belle Ir. com.	— -105½
Am. C. & Fd. pf.	— -117	Lackaw. Steel.	80¼ - 89
Am. Loco. com.	103 -110¾	Lake Sup. Corp.	21 - 21¼
Am. Loco. pf.	— -105	Midvale Steel	47¾ - 52⅝
Am. Radiator cm	— -120	Nat.-Acme	35⅞ - 37½
Am. Ship. com.	124 -128	Nat. E. & St. cm.	75 - 76½
Am. Stl. Fds. cm.	37½ - 40⅜	N. Y. Air Brake.	119½-125⅞
Am. Stl. Fds. pf.	94 - 94⅝	Nova Scotia Stl.	75½ - 80
Bald. Loco., com.	125½-135⅜	Pressed Stl. com.	90¼ - 96⅜
Bald. Loco. pf.	104¾-105	Ry. Stl. Spg. cm.	95 -104½
Beth. Stl. com.	90½ - 95¼	Republic com.	87¾ - 95¼
Beth. Stl. Cl. B.	94¼ - 99⅜	Republic pf.	103 -104½
Case, J. I., pf.	— - 98¼	Sloss com.	61½ - 68
Cent. Fdry. com.	— - 30⅞	Sloss pf.	95 - 97
Cent. Fdry. pf.	— - 45	Superior Steel	40 - 42
Chic. Pneu. Tool	— - 78½	Sup. Stl. 1st pf.	— -102
Colo. Fuel	42¼ - 45⅞	Transue-Williams	55½ - 58½
Cru. Stl. com.	176 -188	U. S. Alloy Steel	49 - 52⅞
Cru. Stl. pf.	— -102	U. S. Pipe com.	27½ - 31
Deere & Co., pf.	100⅜-101	U. S. Pipe pf.	63 - 64
Gen. Electric	161 -165	U. S. Steel com.	100¼-105⅞
Gt. N. Ore. Cert.	40¾ - 44⅛	U. S. Steel pf.	113⅜-114
Gulf States Stl.	58 - 62¼	Westingh. Elec.	53½ - 55½

Dividends

The American La France Fire Engine Co., Inc., quarterly, 2 per cent on the common, payable Oct. 1, and 1¾ per cent on the preferred, payable Nov. 15.

The American Laundry Machinery Co., quarterly, 1 per cent on the common, payable Dec. 1, and 1¾ per cent on the preferred, payable Oct. 15.

The American Seeding Machine Co., quarterly, 1¼ per cent on the common and 1¾ per cent on the preferred, payable Oct. 15.

The Babcock & Wilcox Co., quarterly, 2 per cent, payable Oct. 1.

The Billings & Spencer Co., quarterly, $1.25, payable Oct. 1.

The Brier Hill Steel Co., quarterly, 2½ per cent on the common and 1¾ per cent on the preferred, payable Oct. 1.

The Canadian Locomotive Co., quarterly, 1½ per cent on the common and 1¾ per cent on the preferred, payable Oct. 1.

The Colt's Patent Fire Arms Mfg. Co., quarterly, $1.25, payable Oct. 2.

The Crucible Steel Co. of America, quarterly, 3 per cent on the common, payable Nov. 1. The previous dividend was 1½ per cent.

The Elyria Iron & Steel Co., quarterly, 1¾ per cent on the preferred, payable Oct. 1.

Manning, Maxwell & Moore, Inc., quarterly, 1½ per cent, payable Sept. 30.

The Otis Elevator Co., quarterly, 1¼ per cent on the common and 1½ per cent on the preferred, payable Oct. 1.

The Steel & Tube Co. of America, quarterly, 1¾ per cent on the preferred, payable Oct. 1.

The Trumbull Steel Co., quarterly, 2½ per cent on the common and 1¾ per cent on the preferred, payable Oct. 1.

The Vulcan Detinning Co., quarterly, 1¾ per cent on the preferred and 1 per cent on account of accumulated dividends, payable Oct. 20.

The Westinghouse Air Brake Co., quarterly, $1.75, payable Oct. 31.

The Yale & Towne Mfg. Co., quarterly, 2½ per cent, payable Oct. 1.

The Youngstown Sheet & Tube Co., quarterly, 2½ per cent on the common and 1¾ per cent on the preferred, payable Oct. 1.

Industrial Finance

The American Vitrified Products Co., Akron, Ohio, successor to the American Sewer Pipe Co., recently increased its capital stock. The common stock was reduced from $7,000,000 to $3,500,000 and an issue was authorized for $2,000,000 preferred stock, of which $1,750,000 was to be used for working capital and to retire $1,234,000 of bonds. The issue has been made and the money deposited for the retirement of the bonds. The preferred stock is convertible into common, and $2,000,000 of the common stock was authorized for this purpose.

Directors of the Trumbull Steel Co., Warren, Ohio, have declared a quarterly dividend of 2½ per cent on the common stock and 1¾ per cent on the preferred stock, also a dividend of 1¾ per cent on the preferred stock of the Liberty Steel Co., which is owned by the Trumbull Steel Co. In a statement, the company says that the distribution of 2½ per cent on the common stock is to be regarded as a regular dividend of 1½ per cent and an extra of 1 per cent on the common stock.

Simmons Co., Kenosha, Wis., regarded as the largest manufacturer in the world of steel and metal bedsteads, has increased its authorized capital stock from $20,000,000 to $40,000,000, according to an amendment to its articles of incorporation, filed Sept. 15.

Foreign Trade Notes

WASHINGTON, Sept. 23.—The Bureau of Foreign and Domestic Commerce has made public a cablegram from Commercial Attaché Edwards, at The Hague, setting out the regulations which have been issued by the German Government to control imports and exports. It says that all German imports and exports are subject to individual licenses issued on behalf of the Minister of Economics by the Commissioner for Import and Export Licenses, the object being to secure suitable prices and credits, and to prevent the influx of manufactured and luxury articles, and the outflow of needed raw materials and half-manufactured goods.

Unofficial information has also been received by the Department of Commerce that the new Italian tariff, expected to be in effect Sept. 20, will probably not be in force until some time in November. This does not imply, however, that the status quo will be maintained in the meantime on all classes of goods, it being probable that certain classes of allied goods will be subject to the same rates of duty as those to be imposed on goods from former enemy countries.

Consul Otis A. Glazebrook, at Jerusalem, Palestine, reports to the department that upon the occupation of Palestine the commander in chief of the Egyptian Expeditionary Force stated that as long as it remains under military control all its laws and regulations will be maintained. Thus all goods coming into the country direct may pay the old duty of 11 per cent. Goods coming in transit through Egypt pay 1 per cent transit duty to Egypt and 11 per cent either to Syria or Palestine.

GOVERNMENT SURPLUS

Tonnage Increases in Spite of Recent Rates—The Latest Inventory

WASHINGTON, Sept. 23.—Although there have been considerable sales of iron and steel surplus in the War Department, the September inventory shows an increase of 6834 tons over the August inventory. The figures issued by the office of the Director of Sales shows a total of 643,955 tons on hand Sept. 10, as against 577,121 tons Aug. 11. (THE IRON AGE, Aug. 21, 1919, p. 516.) Besides the sales and new declarations of surplus growing out of late contract adjustments there has been a considerable shifting of classification. This accounts for the fact that the scrap total of 26,046 tons has jumped to much larger figures. In August the Department listed 224,219 tons of shell forgings under the head of semi-finished steel. A considerable portion of this has been sold, but 174,123 tons is now listed as scrap. Another big addition to the scrap list is 86,771 tons of "adapter and booster" assemblies. There was also 16,648 tons of finished shells that are now being listed as scrap.

Following is the inventory of iron, steel alloys, aluminum, lead, brass, bronze and copper in gross tons: Pig iron, 4985; zirconium ore, 740; semi-finished billets, 93,186; semi-finished ingots, 35,572; nickel steel ingots, 3731. Inventory of finished material shows armor plate, 1800; miscellaneous sheets and plates, 75,932; flange steel, 2088; rails 1065; cold-rolled rod and sheet 1721; shell rod, 37,354; adapter steel, 1095; annealed steel, 1011; gun steel, 1817; screw stock, 10,277; strip steel, 1431; tool steel carbon, 2744. In the alloys nickel steel is given as 3179. Under scrap, adapter and booster assemblies are 86,771; base plug forgings, 1705; miscellaneous forgings, 19,361; shell forgings, 174,123; miscellaneous steel scrap, 12,139; finished shells, 16,684. The report shows 2563 tons of cupro nickel, 1013 tons of lead, 10,887 tons of zinc, and 70 tons of aluminum. Brass of 70 per cent copper and 30 per cent zinc totals 79,207 tons and brass of 60 per cent copper and 40 per cent zinc totals 28,636 tons. Total sales of bronze are 267 tons and of copper, 363 tons.

The Boston District Ordnance office, 19 Portland Street, recently opened bids on brass rods as follows: 83,590 lb. in three lots, at the Babson-Dow Mfg. Co., Roxbury, Mass., the U. T. Hungerford Brass & Copper Co., New York, offering an average price of $14.09 per 100 lb., the Babson-Dow Mfg. Co., Boston, offering $15 per 100 lb. on 30,000 lb.; 475,223 lb. in eight lots at the Babson-Dow Co., the Columbia Smelting & Refining Co., New York, offering $15.01 per 100 lb. on the first three lots, the Garden City Plating & Mfg. Co., Chicago, offering $16.25 on the fourth lot, and the U. T. Hungerford Brass & Copper Co. agreeing to take the entire amount for $13.01.

The Boston District Ordnance office, 19 Portland Street, will accept bids on the following tonnages of iron and steel and non-ferrous metals: About six tons of steel bars at the Cape Ann Tool Co., Pigeon Cove, Mass., and the Framingham Forge Co., Framingham, Mass., bids to be in by noon, Oct. 1; 33 tons of component parts for hand grenades ("good scrap metal") at the Gorham Mfg. Co., Phillipsdale, R. I., bids to be in by noon, Oct. 3; 100 tons steel armor plate at the Simonds Mfg. Co., Fitchburg, Mass., bids to be in by noon, Oct. 1; 43 tons of round brass rod at the Scituate Proving Ground Storage Plant, Scituate, Mass., bids to be in by noon, Oct. 3.

WASHINGTON, Sept. 23.—The War Department's sale of surplus property during the week ending Sept. 12 amounted to $6,394,248. This makes a total for the year, since Jan. 1, of $423,014,137 and represents a realization of 76 per cent of the original cost to the Government. The sales of ferrous metals during the week ending Sept. 12 totaled $488,580.50 and for non-ferrous metals $177,396.32. The sales of machinery and engineering equipment for the same period were $258,257.70.

Alfred LaMar, formerly a lieutenant-colonel, has returned from Europe to take charge of the machinery section and the export department of the office of the Director of Sales of the War Department. Mr. LaMar's title is assistant director of sales.

Boston Salvage Board Issues Bulletin

The Boston District Salvage Board, 19 Portland Street, has started issuing a weekly four-page bulletin on surplus Government property to be sold through sealed proposals. The first bulletin contains a list of property including machinery, plant equipment, a plant, and miscellaneous commodities. Bids are to be in by 11.30 a.m., Sept. 29. Included with the machinery are: 2 blowers, 3 boilers and engines, 3 derricks and cranes, 14 drills, 21 grinders, 66 lathes, 17 milling machines, 41 motors, 20 pumps, 4 presses. Included in the miscellaneous are articles of steel and brass, some partly made into war products. The plant advertised is at Gloucester, Mass., and was used as a forge shop, but could be adapted to other uses such as a foundry or machine shop.

Government Offerings

The Cleveland district salvage board, Plymouth Building, offers until 1.30 p.m., Oct. 9, the following: At the National Acme Co., Cleveland, about 632,040 lb. cold rolled bright screw stock 2 13/16 in. diameter and about 949,599 lb. 1⅞ in. cold drawn Bessemer screw stock; at the Vim Motor Co., Sandusky, Ohio, about 1,245,965 lb. forging bars 2 in. diameter and about 367,802 lb. 1 in. round bar steel.

The Pittsburgh office, Chamber of Commerce Building, offers until 1.30 p.m., Oct. 7, at Neville Island Storage Depot, Pittsburgh, about 145,937 lb. high speed steel in the form of dies, die holders, bushings, stripper plates and beams, etc.

The Philadelphia office, 1710 Market Street, requests bids until 2.30 p.m., Oct. 2, on the following: At United States Eddystone Rifle Storage Arsenal, Eddystone, Pa., about 12,326 lb. semi-finished square steel billets, about 90,265 lb. of 5 in. gothic steel billets, about 299,260 lb. of 4 in. square steel billets and about 947,301 lb. of 3½ in. square gothic steel billets, also about 50,000 unpainted, unfinished trench helmets which are offered until 2.30 p.m., Sept. 30. At the Worthington Pump & Machinery Corporation, Hazleton, Pa., until 2.30 p.m., Oct. 1, this office offers about 42,701 lb. round, cold drawn Bessemer stock; until 2.30 p.m., Oct. 6, about 420,834 lb. 2 63/64 in. bar steel; and until 2.30 p.m., Oct. 7, about 5,327 lb. of 1⅞ round, cold drawn steel bars. At the North American Motors Co., Pottstown, Pa., until 2.30 p.m., Oct. 6, is offered about 40,824 lb. partly machined 155 mm. shell forgings and at the Lancaster Steel Products Co., Lancaster, Pa., until 2.30 p.m., Oct. 9, about 22,060 lb. cold, drawn steel wire, annealed and polished. At the Bonney Vise & Tool Works, Allentown, Pa., is offered until Oct. 2, about 465 gross tons of 1 in. bar steel.

The Bridgeport district salvage board, Liberty Building, offers for bids until 1.30 p.m., Sept. 30, about 867,516 lb. hot rolled steel and about 36,994 lb. cold drawn steel at the Remington Arms Works, Bridgeport.

The Baltimore office, Columbia Avenue, offers until 12 m., Oct. 7, at the Bartlett-Hayward Co. about 30,116 lb. 155 mm. shrapnel forgings.

The United States Army Supply Base, New Orleans, offers until 10 a.m., Sept. 30, about 22,920 lb. of galvanized steel sheets, 16 gage, at Army Supply Base, Cumberland, Pa.

The Cincinnati district salvage board, Third and Vine Streets, offers until 2 p.m., Sept. 29 at the Andrews Steel Co., Newport, Ky., about 69 gross tons of 5¾ in. round cornered square steel billets.

The Toronto office offers for bids until 3 p.m., Sept. 29, at the Knight Metal Products Co., Toronto, Ont., about 30 gross tons of 1⅞ round steel bars, cold drawn Bessemer screw stock.

Chicago

CHICAGO, Sept. 22.

The strike of iron and steel workers called yesterday had the initial effect of practically stopping production in the Chicago district. The leading interest at the close of the day still had four blast furnaces going at Gary and four at South Chicago, and four coke oven batteries at Gary and two at Joliet. Otherwise its plants were practically idle. The leading independent has banked all but one furnace and has suspended operation in the remaining departments of its Indiana Harbor plant. The Steel & Tube Co., including the Federal and Iroquois merchant iron furnaces, has practically stopped work. The South Chicago works of the Interstate Iron & Steel Co. has also shut down. Among the few plants still operating with most of their men are the Wisconsin Steel Works, the Grand Crossing and East Chicago plants of the Interstate Iron & Steel Co. and the Chicago Heights plant of the Inland Steel Co., 100 per cent of the force having reported for work at the last-named works.

At this early date it is difficult to make an accurate appraisal of the strike situation. Union leaders claim that 85 per cent of the workers in this district have quit. Company officials, however, are of the opinion that a larger proportion of the men than those who reported for work yesterday will return as soon as they are assured protection against the intimidatory tactics of the strikers. The latter are well organized and are using every possible means to prevent employees from going to work.

At the close of the night shift at the Inland Steel Co. Monday morning several thousand strikers, most of them from South Chicago and Gary, gathered around the clockhouse and prevented employees from reporting for the next shift. It is the intention of the companies to prevent a recurrence of such incidents as this and to provide adequate protection for all men who desire to continue at work. The events of the next few days will indicate whether such measures will prove successful in bringing men back

Pig Iron.—The merchant furnaces in the Chicago metropolitan district have been banked on account of the strike of iron and steel workers and as a result there is a heavy demand for spot iron as well as coke, the coke ovens also having shut down. A lot of 20,000 tons of foundry and malleable at present prices cently closed and a Southern furnace has taken 200 tons of foundry 4 per cent silicon for early delivery. A Northern furnace with a freight rate of $3.30 to Chicago has booked orders for lots of 1500 tons and 1000 tons at a base of $27.50, with deliveries about evenly divided between this fall and next spring. An important local seller closed orders last week for about 20,000 tons of foundry and malleable at present prices for 1920 shipment. The Wisconsin smelter which was reported as in the market a week ago for 1500 tons divided between foundry, malleable, charcoal and silvery, has closed for that amount, specifying delivery next year. Considerable charcoal iron for shipment in the first quarter is being sold at $31.25 furnace, one recent order calling for 2000 tons.

Lake Superior charcoal, average silicon, 1.50 first quarter delivery, f.o.b. furnace, average freight to Chicago, $2.50 (other grades subject to usual differentials)	$31.25
Northern coke foundry, No. 1 silicon, 2.25 to 2.75	29.00
Northern coke foundry, No. 2 silicon, 1.75 to 2.25	26.75
Northern high-phosphorus foundry	26.75
Southern coke, No. 1 foundry and No. 1 soft, silicon, 2.75 to 3.25	$34.75 to 35.75
Southern coke, No. 2 foundry, silicon, 2.25 to 2.75	33.60 to 34.00
Southern foundry, silicon, 1.75 to 2.25	32.50 to 32.75
Malleable, not over 2.25 silicon	27.25
Standard Bessemer	27.95
Basic	25.75
Low phosphorus (copper free)	40.00
Silvery, 7 per cent	42.05

Plates.—A car builder is asking for prices on about 5000 tons of plates, shapes and bars, and 500 tons of axles as a basis for figuring on an inquiry by a local packing company for 400 refrigerator cars. Local plate mills have shut down on account of the strike.

The mill quotation is 2.50c. to 2.65c., Pittsburgh, the freight to Chicago being 27c. per 100 lb. Jobbers quote 3.67c. for plates out of stock.

Structural Material.—The local building trades lockout was finally brought to an end last week when the demands of the unions were granted. The steel strike, however, makes the completion of the long-delayed construction projects in this city problematical. But for this development the settlement of the lockout would have had a stimulating effect on the structural markets. A local mill, for instance, has already taken an order for 1600 tons of 15-in. channels from a Chicago fabricator. Pending fabricating jobs include:

Interstate Iron & Steel Co., merchant bar mill, South Chicago, 1100 tons.

General Motors Corporation, plant, Muncie, Ind., 350 tons.

James Mfg. Company, foundry and machine shop addition, Ft. Atkinson, Wis., 800 tons.

Additional steel for Tribune Building, Chicago, 350 tons.

Evansville Top Panel Co., furniture factory, Evansville, Ind., 170 tons.

Recent fabricating awards include:

University of Iowa, two armories, 810 tons to McClintock-Marshall Co.

General Motors Corporation, plant, Saginaw, Mich., 550 tons, to McClintic-Marshall Co.

Kahl Office Building, Davenport, Ia., 1200 tons, to American Bridge Co.

Ohio Steel Foundry Co., Lima, Ohio, 450 tons, to Toledo Bridge & Crane Co.

Hubbard & Co., galvanizing building, Chicago, 380 tons, to Union Foundry Works.

Home Oil Refining Co., buildings, Franklin, Pa., 200 tons, to American Bridge Co.

Chicago & Northwestern Railroad, bridge near Lick, Ill., 187 tons, to American Bridge Co.

Little Rock Railway & Electric Co., extensions to power house, Little Rock, Ark., 181 tons, to American Bridge Co.

Aurora, Minn., high school, 122 tons, to American Bridge Co.

The mill quotation is 2.45c., Pittsburgh, which takes a freight rate of 27c. per 100 lb. for Chicago delivery. Jobbers quote $3.47 for materials out of warehouse.

General Suspension in Mahoning Valley

YOUNGSTOWN, OHIO, Sept. 22.—The Carnegie Steel Co. to-night banked all of its furnaces at the Ohio works, thus effecting the most complete industrial suspension in the history of the Mahoning Valley.

It appears that all plants here will close except the Trumbull Steel Co., Mahoning Valley Steel Co. and A. M. Byers works, and that the mills will remain idle until the men are willing to return, unless the companies decide to negotiate with the unions.

In Sharon and Farrell, Pa., 6000 men are out, about 20 per cent of whom are strikers. Aside from the Wilkes Rolling Mill, which has an agreement with the Amalgamated, plants were either entirely down or schedules greatly retarded. For instance, the American Sheet & Tinplate Co. operated at Farrell four of 30 hot mills and two of eight sheet mills.

A feature of the annual meeting of the American Foundrymen's Association in Philadelphia will be the launching on Sept. 30 of the Afoundria at the Hog Island shipyards. The boat has been named in honor of the association and will be christened by Mrs. A. O. Backert, wife of the president of the association.

The Prince of Wales inspected the Algoma Steel Co. works at Sault Ste. Marie, Canada, on Sept. 4.

Prices Finished Iron and Steel, f.o.b. Pittsburgh

The prices below, except on nuts, bolts, rivets and spikes, are based on those announced at Washington by the Industrial Board on March 20, 1919, effective the following day, which since that date have largely governed market transactions, though there have been variations, as indicated in market reports on other pages.

Freight rates from Pittsburgh on finished iron and steel products, including wrought iron and steel pipe, with revisions effective Nov. 1, 1918, in carloads, to points named, per 100 lb., are as follows: New York, 27c.; Philadelphia, 24.5c.; Boston, 30c.; Buffalo, 17c.; Cleveland, 17c.; Cincinnati, 23c.; Indianapolis, 25c.; Chicago, 27c.; St. Louis, 34c.; Kansas City, 59c.; St. Paul, 49½c.; Denver, 99c.; Omaha, 59c.; minimum carload, 36,000 lb. to four last named points; New Orleans, 38.5c.; Birmingham, 57.5c.; Pacific Coast, $1.25; minimum carload, 80,000 lb. To the Pacific Coast the rate on steel bars and structural steel is $1.315, minimum carload 40,000 lb.; and $1.25, minimum carload 50,000 lb. On wrought iron and steel pipe the rate from Pittsburgh to Kansas City is 50c. per 100 lb., minimum carload 46,000 lb.; to Omaha, 50c., minimum carload 46,000 lb.; to St. Paul and Minneapolis, 49.5c.; minimum carload 46,000 lb.; Denver, 99c.; minimum carload 46,000 lb. Jacksonville, Fla., all rail, car lots, 41.5c.; less, 59c.; rail and water, car lots, 34.5c.; less, 46.5c. A 3 per cent transportation tax applies. On iron and steel items not noted above, rates vary somewhat and are given in detail in the regular railroad tariffs.

Structural Material

I-beams, 3 to 15 in.; channels, 3 to 15 in.; angles, 3 to 6 in., on one or both legs, ¼ in. thick and over, and Zees, structural sizes, 2.45c.

Wire Products

Wire nails, $3.25 to $3.50 base per keg; galvanized, 1 in. and longer, including large-head barbed roofing nails, taking an advance over this price of $1.50, and shorter than 1 in., $2.00. Bright basic wire, $3.15 per 100 lb.; annealed fence wire, Nos. 6 to 9, $3.00; galvanized wire, $3.70; galvanized barbed wire and fence staples, $4.10; painted barbed wire, $3.40; polished fence staples, $3.40; cement coated nails, $2.85 base; these prices being subject to the usual advances for the small trade, all f.o.b. Pittsburgh, freight added to point of delivery, terms 60 days net, less 2 per cent off for cash in 10 days. Discounts on woven-wire fencing are 60 per cent off list for carload lots, 59½ per cent for 1000-rod lots, and 58½ per cent off for small lots, f.o.b. Pittsburgh.

Bolts, Nuts and Rivets

Large structural and ship rivets.....$3.90 base
Large boiler rivets $4.00
¼ in., 5/16 in. and 7/16 in. diameter....60-5 per cent off list
Machine bolts, hp. nuts, ⅜ in. x 4 in.:
Smaller and shorter, rolled threads.....60 per cent off list
Cut threads .....50-10 per cent off list
Larger and longer sizes.....45-5 per cent off list
Machine bolts, c.p.c. and t. nuts, ⅜ in. x 4 in.:
Smaller and shorter.....40-10-5 per cent off list
Larger and longer .....40 per cent off list
Carriage bolts, ¾ in. x 6 in.:
Smaller and shorter, rolled threads..50-10 per cent off list
Cut threads .....50 per cent off list
Larger and longer sizes.....40-5 per cent off list
Lag bolts .....60 per cent off list
Plow bolts, Nos. 1, 2 and 3.....50-5 per cent off list
Plow bolts, Nos. 4 to 10.....50-5 plus 20 per cent off list
Hot pressed nuts, sq. blank.....3.10c. per lb. off list
Hot pressed nuts, hex. blank.....3.10c. per lb. off list
Hot pressed nuts, sq. tapped.....2.85c. per lb. off list
Hot pressed nuts, hex. tapped.....2.85c. per lb. off list
C.p.c. and t. sq. and hex. nuts, blank....3.10c. per lb. off list
C.p.c. and t. sq. and hex. nuts, tapped....2.85c per lb off list
Semi-finished hex nuts:
⅝ in. and larger.....70 per cent off list
9/16 in. and smaller .....75-10 per cent off list
Stove bolts in packages.....75-10 per cent off list
Stove bolts in bulk.....75-10-2½ per cent off list
Tire bolts .....60-10 per cent off list

The above discounts are from Aug. 4, 1919.
All prices carry standard extras, Pittsburgh basis.

Wire Rods

No. 5 common basic or Bessemer rods to domestic consumers, $52; chain rods, $60; screw, rivet and bolt rods and other rods of that character, $60. Prices on high carbon rods are irregular. They range from $65 to $75, depending on carbons.

Railroad Spikes and Track Bolts

Railroad spikes, ½ in., 9/16 in. and larger, $3.35 per 100 lb. in lots of 200 kegs of 200 lb. each or more; spikes, ⅜ in., 7/16 in. and smaller, $3.85 to $4 per 100 lb. in lots of 200 kegs of 200 lb. each or more; track bolts, $4.35 to $4.50 per 100 lb. in carload lots of 200 kegs or more, with the usual extras for small lots. Boat and barge spikes, $3.85 to $4 per 100 lb. in carload lots of 200 kegs or more, f.o.b. Pittsburgh.

Terne Plates

Prices of terne plate are as follows: 8-lb. coating, 200 lb., $13.80 per package; 8-lb. coating, I. C., $14.10; 12-lb. coating, I. C., $15.80; 15-lb. coating, I. C., $16.80; 20-lb. coating, I. C., $18.05; 25-lb. coating, I. C., $19.30; 30-lb. coating, I. C., $20.30; 35-lb. coating, I. C., $21.30; 40-lb. coating, I. C., $22.30 per package, all f.o.b. Pittsburgh, freight added to point of delivery.

Iron and Steel Bars

Steel bars at 2.35c. from mill. Prices on bar iron are 2.75c.

Wrought Pipe

The following discounts are to jobbers for carload lots on the Pittsburgh basing card:

Butt Weld

Steel: Inches	Black	Galv.	Iron: Inches	Black	Galv.
⅛, ¼ and ⅜	50½	24	⅛ and ¼	29½	2½
½	54½	40	⅜	30½	3½
¾ to 3	57½	44	½	34½	16½
			¾ to 1½	30	23½

Lap Weld

2	50½	38	1¼	24½	9½
2½ to 6	53½	41	1½	31½	17½
7 to 12	50½	37	2	32½	18½
13 and 14	41	..	2½ to 6	34½	21½
15	38½	..	7 to 12	31½	18½

Butt Weld, extra strong, plain ends

⅛, ¼ and ⅜	46½	29	⅛, ¼ and ⅜	28½	11½
½	51½	39	½	33½	20½
¾ to 1½	55½	43	¾ to 1½	39½	24½
2 to 3	56½	44			

Lap Weld, extra strong, plain ends

2	48½	37	1¼	25½	10½
2½ to 4	51½	40	1½	31½	17½
4½ to 6	50½	39	2	33½	20½
7 to 8	46½	33	2½ to 4	35	23½
9 to 12	41½	28	4½ to 6	34½	22½
			7 to 8	26½	14
			9 to 12	21½	9½

To the large jobbing trade an additional 5 per cent is allowed over the above discounts, which are subject to the usual variations in weight of 5 per cent.

On butt and lap weld sizes of black iron pipe, discounts for less than carload lots to jobbers have been seven (7) points lower (higher price) than carload lots and on butt and lap weld galvanized iron pipe have been nine (9) points lower (higher price).

Boiler Tubes

The following are the prices for carload lots, f.o.b. Pittsburgh:

Lap Welded Steel		*Charcoal Iron*	
3½ to 4½ in.	40½	3½ to 4½ in.	—16
2½ to 3¼ in.	30½	3 to 3¼ in.	— 1½
2¼ in.	24	2½ to 2¾ in.	+ 1
1¾ to 2 in.	19½	2 to 2¼ in.	+10
		1¾ to 1⅞ in.	+20

Standard Commercial Seamless—Cold Drawn or Hot Rolled

Per Net Ton		Per Net Ton	
1 in.	$327	1¾ in.	$207
1¼ in.	267	2 to 2½ in.	177
1⅜ in.	257	2¾ to 3¾ in.	167
1½ in.	207	4 in.	187
		4½ to 5 in.	207

These prices do not apply to special specifications for locomotive tubes nor to special specifications for tubes for the Navy Department, which will be subject to special negotiations.

Sheets

Makers' prices for mill shipments on sheets of United States standard gage in carload and larger lots are as follows:

	Cents per lb.
Blue Annealed—Bessemer	
No. 8 and heavier	3.50
Nos. 9 and 10 (base)	3.55
Nos. 11 and 12	3.60
Nos. 13 and 14	3.65
Nos. 15 and 16	3.75
Box Annealed, One Pass Cold Rolled—Bessemer	
Nos. 17 to 21	4.15
Nos. 22 to 24	4.20
Nos. 25 and 26	4.25
No. 27	4.30
No. 28 (base)	4.35
No. 29	4.45
No. 30	4.55
Galvanized, Black Sheet Gage—Bessemer	
Nos. 10 and 11	4.70
Nos. 12 to 14	4.80
Nos. 15 and 16	4.95
Nos. 17 to 21	5.10
Nos. 22 to 24	5.25
Nos. 25 and 26	5.40
No. 27	5.55
No. 28 (base)	5.70
No. 29	5.95
No. 30	6.20
Tin-Mill Black Plate Bessemer	
Nos. 15 and 16	4.15
Nos. 17 to 21	4.20
Nos. 22 to 24	4.25
Nos. 25 to 27	4.30
No. 28 (base)	4.35
No. 29	4.40
No. 30	4.40
Nos. 30½ and 31	4.45

PERSONAL

JOHN B. WARREN, who recently became president of the enlarged Tacony Steel Co., which has absorbed the Tacony Ordnance Corporation, Philadelphia, is one of the youngest steel company executives in the United States. Mr. Warren was 33 years old on his last birthday. With the acquisition of the ordnance plant, which was built by the War Department during the war to make gun forgings, the Tacony Steel Co. becomes one of the foremost steel forging producers in the country. At the age of 20, Mr. Warren became an apprentice at the plant of the Babcock & Wilcox Co., Bayonne, N. J., and after two years there he joined the Philadelphia Steel & Forge Co., the former name of the small company from which the Tacony Steel Co. developed. Mr. Warren relates that when he later became superintendent of this small plant it needed orders more than it did a superintendent, so he became a salesman as well. He was so successful in getting business that he was rewarded with election as secretary and manager of the plant, as well as member of the board of directors. At the outbreak of the European war, the plant received a large order for shell bars from an Eastern shell-making company, and there began its real progress toward its present status in the industry. When the United States entered the war, the War Department sought out concerns which were in a position to utilize their experience and abilities in making gun forgings. The result was the organization of the Tacony Ordnance Corporation, which, with Government aid, built a complete steel making and forging plant adjoining the works of the Tacony Steel Co. The plant was in operation within seven months from the time ground was broken. When the War Department began offering its war plants for sale, the Tacony Steel Co. purchased the ordnance plant. In the reorganization of the company, with greatly increased capital, Mr. Warren was elected president and general manager.

JOHN B. WARREN

W. Edward Lindsay has been elected engineer of the Lancaster Structural & Foundry Works, Lancaster, Pa. This company has purchased the property of the Lancaster Machine & Structural Works. Edgar G. Hess, formerly with the Lancaster Foundry Co., has been made works manager of the Lancaster Structural & Foundry Works.

D. J. Suter has resigned as auditor of the Luther Grinder Mfg. Co., Milwaukee, Wis., to be succeeded by Judge J. C. Karel.

L. H. Sturtevant, vice-president and general manager the Sturtevant Mill Co., Boston, has been elected a director of the Boylston National Bank, Boston.

George E. Chamberlain, former district manager Youngstown, Ohio, office of Stone & Webster, has been transferred to Chicago, though retaining general supervision over the Youngstown office. R. E. McGrew has been named general superintendent at Youngstown.

Philip Stremmel, general superintendent National Enameling & Stamping Co., St. Louis and Granite City, has been appointed to serve as director of the 1919 winter term of the School for Safety Engineers conducted by the National Safety Council at St. Louis, Rochester, N. Y., Cleveland and Pittsburgh. The school at St. Louis is conducted under the direction of the Council by the local Chamber of Commerce.

Joseph E. Davies, former Commissioner of Corporations and later chairman of the Federal Trade Commission, has become the counsel for the American Fair Trade League, Washington. He is urging particularly the passage of the Stephens-Ashurst bill which legalizes the fixing of resale prices.

Samuel Siddall, vice-president and treasurer of the Warren Iron & Steel Co., Warren, Ohio, for the past seven years, has disposed of his interests in the company and retired from participation in its business.

William Allen Ragan, for years in the aluminum and white metal alloys business of Indiana, Ohio and Michigan, has started the Ragan Metal Sales Co. with offices in Indianapolis, selling all metals except pig iron and steel.

Henry F. Frasse, formerly connected with and widely known in the export machinery and hardware trades, has been promoted to full charge of all purchases, stores and supplies of the Brooklyn Edison Co., Inc., of Brooklyn, N. Y., with which firm he has been for the past 13 years. His grandfather was a collaborator of Robert Fulton, having made the model from which Bolton & Watt, in England, constructed the engine used to drive Fulton's "Clermont", the first steam-propelled water craft.

Henry A. Butler, who served the Red Cross in France, winning a captaincy, resumed his duties Sept. 25 as head of the cost department of the Youngstown Sheet & Tube Co., Youngstown, Ohio.

Walter E. Brown, former auditor of the old Youngstown Iron & Steel Co., and later in the auditing department of the Sharon Steel Hoop Co. at the Mahoning Valley works, has resigned as manager of Maryvale farm, owned by Jonathan Warner, president Trumbull Steel Co., Warren, Ohio. At present Mr. Brown is conducting a farm in Trumbull County where he is raising Jersey cattle.

E. M. Champion, formerly factory manager Bay City plant, C. R. Wilson Body Co., has been made factory manager in charge of production, with headquarters in Detroit.

H. H. McClintic, vice-president McClintic-Marshall Co., Pittsburgh, steel fabricator, has been elected a director of the Slick-Knox Co., Pittsburgh, with works at Sharon, Pa.

Homer S. Morrison, formerly assistant superintendent of the steel plant of the Sharon Steel Hoop Co. at Lowellville, Ohio, has been appointed superintendent of the blooming and bar mills, succeeding William Parry, resigned.

William F. Ling, formerly with the Robert H. Ingersoll Co., has been appointed by the Hobbs Mfg. Co., Worcester, Mass., manufacturer of paper box machinery, representative for its lock washer line in Detroit, Cleveland and vicinity. The branch office will be established in Detroit.

E. Phelps Langworthy, formerly assistant works manager of the American Steel Foundries, Indiana Harbor, Ind., has been appointed manager of the steel casting plant of the American Radiator Co., Buffalo, N. Y. G. W. Merrefield, formerly of the Clark Equipment Co., Buchanan, Mich., has been appointed assistant to Mr. Langworthy, to be in charge of sales.

Melville J. Collins has been named general superintendent of the Mahoning Valley Steel Co. at Niles, Ohio, succeeding William Lynch, resigned. Mr. Collins has been with the company since it was formed and was formerly in the operating department of the Empire mills at Niles of the Brier Hill Steel Co.

V. L. Curran, purchasing agent Sparks-Withington Co., Jackson, Mich., has resigned, as he has obtained an interest in the Jackson Screw Products Co. and assumes the position of general manager immediately.

G. P. Goodman, who for several years has represented the Hisey-Wolf Machine Co. in the East, will join F. H. Niles & Co., Inc., on Oct. 1 to take charge of the portable tool department. F. H. Niles & Co. handles not only the Hisey-Wolf line of electric machine tools but the Canton pneumatic hammers and

drills manufactured by the Pittsburgh Pneumatic Co. in the East. F. H. Crawford has been appointed secretary and J. E. Haetten sales manager.

N. T. Harrington, consulting engineer, Cleveland, addressed the Cleveland Engineering Society, on Sept. 23 on the relationship between the engineer and the salesman.

C. E. Johansson of C. E. Johansson, Inc., 245 West Fifty-fifth Street, New York, a maker of gage blocks, is now in this country, having recently arrived from Sweden.

V. L. Curran, purchasing agent Sparks-Withington Co., Jackson, Mich., has resigned, as he has obtained an interest in the Jackson Screw Products Co. and assumes the position of general manager immediately.

C. F. Hèrington, formerly mechanical engineer of the Bonnot Co., Canton, Ohio, is now district manager of the Chicago office of the same company with office at room 882, Continental & Commercial National Bank Building.

In recognition of services rendered to the Bound Brook Oil-less Bearing Co., Bound Brook, N. J., Harry J. Lindsley who has been Western sales manager for the past seven years, and William F. Jennings, who has been Eastern sales manager for the past five years, have been made vice-presidents of their company.

L. R. Custer, formerly development engineer Midvale Steel & Ordnance Co., has been elected vice-president of the Cambria Steel Co., Johnstown, Pa., a subsidiary of the Midvale Co. He was born in Altoona, Pa., in 1873, and his first work was as a machinist in the Altoona, Pa., shops of the Pennsylvania Railroad. He was graduated from Cornell University in 1902, and was then employed by the Baldwin Locomotive Works, later as a draftsman by the Jones & Laughlin Steel Co., Pittsburgh. In 1914, he was made contracting foreman at the Homestead Steel Works of the Carnegie Steel Co. and later was superintendent of the armor department at that plant. Shortly before the end of the war, he left the Carnegie Steel Co. to go with the Midvale Steel & Ordnance Co. He has assumed his new duties.

John Kopf, formerly wit hthe Bureau of Aircraft Production, Dayton, Ohio, has been appointed manager of the engineering department of the Duff Mfg. Co., N. S., Pittsburgh, manufacturer of lifting jacks and other specialties.

Robert Field has joined Fairbank & Co., general offices, Wade Building, Cleveland, with branch office at Uniontown, Pa., and will have charge as manager of sales of the coke, coal and pig iron departments. Mr. Field for 15 years was Central Western agent for the Sloss-Sheffield Steel & Iron Co., Birmingham, Ala., and exclusive sales agent for the LaFollette Coal, Iron & Railway Co., LaFollette, Tenn.

William E. Kelly, president and general manager Kelly Reamer Co., Cleveland, retires from active management of the company's affairs, his duties being turned over to J. M. Davie, assistant general manager. O. H. Root, former acting secretary, having accepted a position elsewhere, will sever his connection with the Kelly Reamer Co., the position of assistant secretary being now held by George H. Moore.

Ernest N. Smith has resigned as secretary of the Indianapolis Chamber of Commerce to become general manager of the Holcomb & Noke Mfg. Co. of that city, maker of high-grade specialties.

E. G. Buckwell, secretary and manager of sales of the Cleveland Twist Drill Co., Cleveland, has just returned from a three months' visit to England and the Continent where he has made a thorough trade investigation in conjunction with the European branch, the Cleveland Twist Drill Co. of Great Britain, Ltd., London.

Haynes Stellite Co., Kokomo, Ind., will have an exhibit at the American Foundrymen's convention at Philadelphia consisting of lathe and machine tools, milling cutters, surgical and dental instruments and pocket knives. It will be represented by P. P. Hale, sales engineer; Roe L. Johnson, Eastern sales manager; H. S. Dunham, Eastern office manager.

OBITUARY

THEODORE O. VILTER, president Vilter Mfg. Co., Milwaukee, and one of the best known refrigerating engineers in the United States, died at his home in Milwaukee on Sept. 19, at the age of 61. Mr. Vilter was born in Germany but came to America when 14 years of age with his parents, who located in Milwaukee. In 1879 his father purchased an interest in the machine shop of Peter Weisel and the firm became known as Weisel & Vilter. Mr. Vilter entered the employ of the firm as an apprentice and in 1882 acquired an interest. The plant was destroyed by fire in 1892. The Vilter Mfg. Co. was then incorporated and established a plant at Clinton and Becher streets, which originally was devoted to the manufacture of brewers' and bottlers' machinery and equipment, but later entered the Corliss engine and refrigerating machinery fields, becoming one of the largest and best known concerns in the industry. Mr. Vilter was a former president of the American Society of Refrigerating Engineers and served as chairman of the International Refrigeration Congress when this was held in Milwaukee in 1910. He also held memberships in numerous engineering societies and served as chairman of local, district and national chapters. Mr. Vilter was prominent in the old Merchants' and Manufacturers' Association and its successor, the Milwaukee Association of Commerce, for more than 30 years.

JOHN P. BRENNEN, coke producer, died at his home in Scottdale, Pa., Sept. 16, following a relapse from an apparent recovery from a long illness. For more than 40 years Mr. Brennen was very actively identified with the coke industry in this country. Until recently he was president of the Thompson-Connellsville Coke Co., until that concern was taken over by the Hillman Coal & Coke Co., Pittsburgh. At the time of his death he was president of the Klondike Supply Co., Pittsburgh; Producers' Coke Co., Uniontown, Pa.; vice-president Connellsville Central Coke Co.; vice-president General Water Co., Pittsburgh; director of the First National Bank, Scottdale, and a director of the Scottdale Savings & Trust Co., Scottdale. For many years Mr. Brennen was general manager of the Pittsburgh & Terminal Coke Co. and the West Side Belt Co.

GEORGE L. FOLLANSBEE, of Pittsburgh, formerly treasurer of the Follansbee Brothers Co., tin-plate and sheet manufacturer, with mills at Follansbee, W. Va., died on Saturday, Sept. 20, at Hendersonville, N. C., where he had been since March, 1919, on account of ill health. In his early life Mr. Follansbee was engaged in the printing business, later becoming a partner in the firm of Allan C. Kerr & Co. He left that company to become Pittsburgh manager for the American Type Foundries Co., and his last active position was treasurer of the Follansbee company. He resigned that position, effective at the end of last year, after an attack of pneumonia which seriously impaired his health.

W. CROMWELL GURNEY, president and general manager Gurney Foundry Co., Toronto, Ont., was overcome by an attack of heart trouble on Sept. 17 and died within a few minutes. He was the eldest son of the late Edward Gurney, founder of the Gurney Foundry Co. Last spring he suffered a severe attack of la grippe, which affected his heart, and he had not been in good health since. Mr. Gurney, who was in his 46th year, was born and educated in Toronto, and had been connected with the Gurney Foundry since he entered upon commercial activities.

JOSEPH F. SEAMAN, JR., aged 45, died at his home in the East End, Pittsburgh, on Sunday, Sept. 21. He was the son of Joseph S. Seaman, for many years head of the Seaman-Sleeth Co., Pittsburgh, manufacturer of rolls, but now known as the Pittsburgh Rolls Corporation. Mr. Seaman was a graduate of the University of Pittsburgh, and is survived by his wife and two sons.

Machinery Markets and News of the Works

UNREST HALTS SALES

Persistent Demand Coming From Automobile and Accessory Makers

Large Manufacturers Buying Land for Future Expansion—Moderate Export Tool Trade—List for Puget Sound Navy Yard

Buying of machine-tool equipment has slowed down on account of the unsettled labor conidtions at the steel plants. Manufacturers in Cleveland and at other important industrial centers state that they will not place orders for additional machinery until the situation clears. In centers along the Atlantic seaboard this condition has acted to protract the period of moderate demand that has for some time characterized markets there.

The bulk of active buying continues to come from the automobile industry, a great deal of it being for small lots. The General Motors Corporation is placing orders for its Canadian plant at Walkerville, Ont. Two inquiries for round lots from the Firestone interests at Akron are still pending. The Gillespie Motors Corporation, Paterson, N. J., has been in the market.

The acquisition of plants and properties by new interests are still a feature of developments in this field. At Indianapolis the Stenotype plant has been acquired by D. McC. White and E. C. Howard of Detroit, who have bought 15 acres additional land. The controlling interest in the Premier Motor Corporation has been purchased by L. S. Skelton, Okmulgee, Okla., who will immediately enlarge the works.

A corresponding activity is taking place in the organization and expansion of companies manufacturing automobile parts and accessories; but the enlargement of manufacturing facilities is by no means confined to this field. In connection with manufacturing plans generally, provision for future expansion of industries is being made by many companies by the acquisition of adjoining land.

A list of equipment including over 75 metal-working tools has been issued by the Bureau of Supplies and Accounts, Navy Department, Washington, for the Puget Sound Navy Yard.

A moderate export business is being done; and according to reports from Cincinnati local makers of shaping machines are receiving inquiries from England, France, Belgium and the Scandinavian countries. A favorable aspect of American machinery trade in Europe is derived from the fact that Swedish manufacturers are purchasing here despite the fact that German prices are 60 per cent below American c.i.f. quotations, irrespective of the exchange.

New York

NEW YORK, Sept. 22.

The J. G. White Engineering Corporation, 43 Exchange Place, New York, has begun the placing of orders on a list of tools for a client in Switzerland who will build a new plant for the manufacture of electric motors. Purchases will total about $250,000, but only a part of this has been placed.

Otherwise, export business is quiet, but an interesting sale last week was six lathes of a well-known make for shipment to Sweden. In this particular transaction the higher prices of American tools was not taken into consideration, but on a large part of the business being placed by Swedish manufacturers German machine-tool builders are not walking away with the orders easily. German prices, irrespective of the exchange, are 60 per cent or more below the American c.i.f. prices.

Domestic machine-tool business in the East is dull, this being due very largely to the unsettlement which has been caused by the prospect of a steel strike. The E. W. Bliss Co., Brooklyn, and the Gillespie Motors Corporation, Paterson, N. J., have been fairly good buyers, the former company acquiring new equipment for the plant of the Consolidated Press Co., Hastings, Mich., which it recently bought.

Barbour, Love & Woodward, 917 Singer Building, New York, machinery merchants, have acquired about 1150 used tools, all that remained of the equipment used during the war in the plant of the International Arms & Fuze Co., Bloomfield, N. J. The Bloomfield plant has been purchased by the General Motors Corporation for the manufacture of automobile bodies.

The Rochester Spectacle Co., Rochester, N. Y., is in the market for a new or used surface grinder, equivalent to a Brown & Sharpe No. 2.

B. N. Sen & Bros., 941 Clive Street, Calcutta, India, have sent to THE IRON AGE an inquiry for machine-tool equipment for a small workshop for repairing automobiles. Exporters may quote direct to this firm.

The Wittemann-Lewis Aircraft Co., Lincoln Highway, Newark, N. J., manufacturer of airplanes, has arranged for the construction of a new plant near Hasbrouck Heights, N. J., to consist of a number of buildings, with about 50,000 sq. ft. of floor area to be devoted to manufacturing operation. Erection has been inaugurated on three buildings, to comprise a main one- and two-story structure, 165 x 200 ft., for construction and assembling operations; a second building for covering work, and a third for engine testing, etc. This latter structure will also contain a boiler and engine plant. Another structure to be erected at an early date will be equipped as a pumping plant.

The Nichols Copper Co., Laurel Hill, Long Island, N. Y., has had plans prepared for a one-story addition, 157 x 182 ft., on Hebson Avenue, Long Island City, to cost about $75,000. The J. G. White Engineering Corporation, 43 Exchange Place, New York, is the engineer.

The Columbia Tinware Co., Brooklyn, has been incorporated with a capital stock of $20,000 by J. Menoff, J. Leavitt and S. Antoville, 351 East Forty-ninth Street, to manufacture metal and tinware specialties.

The Jensen Oil Engine & Machine Co., Brooklyn, has been incorporated with a capital stock of $20,000 by C., C. P. and B. Jensen, 220 Wakeman Place, to manufacture engines, machinery, parts, etc.

Barber & Co., 17 Battery Place, New York, have awarded a contract to the Robbins-Ripley Co., 50 Church Street, for a new one-story machine shop on King Street, near Ferris Street, Brooklyn, 100 x 100 ft., to cost about $50,000. J. Barber is president.

Rost, Angstman & Briese, Inc., New York, has been incorporated with a capital stock of $50,000 by R. W. Angstman, A. G. Briese and N. G. Rost, 637 Greene Avenue, Brooklyn, to manufacture machine-shop and foundry equipment.

The Freidus Machinery Co., New York, has been incorporated with a capital stock of $10,000 by Samuel E. and B. Aaron, and Benjamin Salinsky, 31 Essex Street, to manufacture machinery and parts.

The Worthington Pump & Machinery Co., 115 Broad-

way, New York, has arranged for the erection of a one-story addition to its Laidlaw Works, Cincinnati, Ohio, to cost about $75,000.

The Philip P. Smith Co., New York, has been incorporated with a capital stock of $10,000 by P. G. and S. L. Simon, and Philip P. Smith, 11 Broadway, to manufacture metal products.

The Monofer Shipbuilding Co., New York, has been incorporated with an active capital of $30,000 by J. L. Druck, L. F. Sniffin and F. Kweton, 49 Wall Street, to build ships of cast steel, under license of the Cast Steel Ship Corporation, 114 Liberty Street, New York.

The Welsh-Hills Co., Yonkers, N. Y., has been incorporated with a capital stock of $20,000 by A. K. Hills, C. F. and W. H. Welsh, Bronxville, to manufacture surgical instruments.

The Acme Garage, 21 Catherine Street, Jamaica, L. I., is having plans prepared for a one-story repair shop and service works, 50 x 100 ft., on Rockaway Road, to cost about $15,000. N. Nardi is president.

The New York Coin Operated Machine Co., 96 Spring Street, New York, has filed notice of dissolution.

The Dry Dock Sheet Metal Works, 140 West Forty-second Street, New York, has acquired property, 25 x 100 ft., at 509 East Eightieth Street, and plans for a new three-story plant.

The Empire Repair & Electric Welding Co., New York, has been incorporated with a capital stock of $1,000,000 by R. C. Thackhara, E. F. Luckenback and C. Kuhne, 41 Whitehall Street, to manufacture electric welding equipment, etc.

Laverne C. Brown, Inc., Brooklyn, has been incorporated with a capital stock of $50,000 by J. P. Morgan, Laverne C. and A. L. Brown, Hotel Commodore, New York, to manufacture car equipment, ship apparatus, etc.

The Hope Metal Co., Brooklyn, has been incorporated with a capital stock of $20,000 by A. J. Shapiro, S. Wacht, Jr., and N. H. Streimer, 170 Broadway, New York, to manufacture metal specialties.

The White Co., Park Avenue and Fifty-seventh Street, New York, manufacturer of automobiles, with headquarters at Cleveland, Ohio, has awarded a contract to the American Concrete Steel Co., 31 Clinton Street, Newark, N. J., for its proposed one-, two- and four-story works building, reinforced concrete and brick, 200 x 400 ft., on the block bounded by Thompson and Mott avenues, Mount and School streets, Long Island City, N. Y.

The National Auto Accessories Co., New York, has been incorporated with a capital stock of $25,000 by M. and H. and L. Epstein, 127 West 112th Street, to manufacture automobile equipment, parts, etc.

The Electric Auto-Lite Co., 224 West Forty-ninth Street, New York, a Delaware corporation, has materially increased its capital from $15,000,000. The company specializes in the manufacture of automobile lighting equipment, and has a plant at Toledo, Ohio.

The Monsoon Cooling System, Inc., New York, has been incorporated with a capital stock of $25,000 by M. Strunsky, E. L. Garfield and J. F. Dailey, 819 West One Hundred and Eightieth Street, to manufacture ventilators, ventilating equipment, etc.

The American Safety Razor Corporation, New York, has been organized to take over and merge the Gem Safety Razor Co., 210 Eleventh Avenue, the Star Safety Razor Co., 8 Reade Street, New York, and the Ever-Ready Safety Razor Co., 303 Jay Street, Brooklyn. The capital of the new company will be $20,000,000. The new organization will continue the operation of the present plants of the different companies and proposes general expansion for increased production. George L. Storm will be chairman of the board, and Joseph Kaufman will be president.

The Acme Furnace Equipment Co., New York, has been incorporated with a capital stock of $21,000 by R. W. Owens, E. W. Stuart and F. M. Clute, 100 Broadway.

The Firestone Tire & Rubber Co. 1871 Broadway, New York, manufacturer of automobile tires, tire rims, steel bases for solid tires and kindred products, with works at Akron, Ohio, has arranged for a preferred stock issue of $10,000,000. The proceeds will be used in part for the construction of a new mechanical building, a new steel rim manufacturing plant, additional equipment to increase the capacity of plant No. 2, and new operating equipment to enlarge the output of cord tires.

The Henderson Tire & Rubber Co., White Plains, N. Y., has been incorporated with a capital of $11,000,000 by Dorman T. Connett, White Plains; J. Cullen, New York; and C. M. McKeever, Brooklyn, to manufacture automobile tires and rubber products.

The Motorware Mfg. Corporation, New York, has been incorporated with a capital of $10,000 by R. and R. I. Isaksen, and L. M. Schwartz, 1159 Eastern Parkway, Brooklyn, to manufacture automobile equipment.

The Aeolian Co., Aeolian Hall, West Forty-second Street, New York, manufacturer of talking machines, pianos, organs, etc., has acquired property totaling about 53 acres of land at West Elizabeth, N. J., for the establishment of a new plant. The initial work will comprise several buildings, with later development to a large group plant. The proposed works, it is said, will cost in excess of $1,000,000.

The Brockway Motor Truck Co., 544 West Thirty-eighth Street, New York, has developed a new type of truck for handling coal, and is devoting a portion of its plant to the production of this new machine. The front axle of the truck is placed under the center of the engine, giving a smaller turning radius with a more powerful vehicle.

The J. G. White Management Corporation, 43 Exchange Place, New York, operating the Manila Electric Railroad & Lighting Corporation, Manila, P. I., has arranged for a note issue of $1,500,000 for the company, through its affiliated organization, J. G. White & Co., 37 Wall Street. The proceeds will be used for extensions and improvements in the company's power plants and system. J. H. Pardee is vice-president of the Manila company.

The Superior Body Corporation, Rahway, N. J., has been incorporated with a capital stock of $500,000 by Joseph Oxman, Thomas and David Armstrong, to manufacture automobile and carriage bodies.

The Columbus plant of the United States Industrial Alcohol Co., 450 Greenpoint Avenue, Greenpoint, Long Island City, N. Y., was destroyed by fire, Sept. 13, with loss estimated at $750,000. Headquarters of the company are at 27 William Street, New York. Horace Rubens is chairman of the board.

A. Schrader's Son, Inc., 783 Atlantic Avenue, Brooklyn, manufacturer of brass and metal products, is building a 10-story, brick manufacturing works, 90 x 196 ft., on Vanderbilt Avenue, to cost about $450,000.

The New Baltimore Shipbuilding & Repair Co., New Baltimore, N. Y., has been incorporated with a capital stock of $45,000 by W. J. Wade, W. W. Stebbins and R. B. Drew, 597 Henry Street, Brooklyn, N. Y., to build and repair ships

The Utica Heater Co., Lafayette Street, Utica, N. Y., manufacturer of hot-air, steam and water heaters, has awarded a contract to John U. Schmidt, 1505 Weston Avenue, for three one-story additions to its plant at Whitesboro, to cost about $20,000. E. I. Hodges is manager.

The Universal Power Corporation, Jersey City, N. J., with registered office at 37 Yale Avenue, has been incorporated with a capital stock of $100,000 by Herbert F. and Rufus F. Andrews, and Frank J. McManus, to manufacture aeroplanes, motors and parts.

The Perfection Welding Co., Bayonne, N. J., has been incorporated with a capital stock of $10,000 by Otto G. Heine, Henry C. Kolbe and Jerome R. Paparella, to manufacture welding equipment.

The plant of the Martini & Huneke Co. of America, 1201 Hudson Street, Hoboken, N. J., manufacturer of devices and equipment for inflammable liquid protection, etc., has been purchased by Carl Willenborg, Hoboken, at a sale held by the Alien Property Custodian, for about $12,000.

The West Hoboken Cornice & Skylight Works, 335 Spring Street, West Hoboken, N. J., has filed notice of organization to manufacture metal specialties. Nathan Wiltz, 78 New York Avenue, Union Hill, heads the company.

The Hoover Machine Co., 380 Wayne Street, Jersey City, N. J., has filed notice of organization to manufacture machinery and parts. Charles S. Hoover, 580 Newark Avenue, Jersey City, is president.

The Newark Gas Engine & Mfg. Co., 676 North Sixth Street, Newark, N. J., has arranged for a dissolution of the organization. Frederick G. Hoerl is secretary-treasurer.

The Newark Metal Ceiling Co. and the Bergen Mfg. Co. of New Jersey, 144 Leslie Street, Newark, N. J., have been incorporated, each with capital stock of $10,000, by Emil H. Fickinger, 271 Park Hill Avenue, Yonkers, N. Y.; John C. Dressel, 537 Park Avenue, Hoboken, N. J.; and Edward A. Scott, 47 Schley Street, Newark. The companies will be operated as separate organizations, the first to manufacture metal ceilings and the other building products of metal.

The Transfer Metal Casting Co., Doremus Avenue, Newark, N. J., has filed notice of organization to manufacture castings, etc. Joseph P. Keegan, 85 Somme Street, heads the company.

The American Platinum Co., 231 New Jersey Railroad Avenue, Newark, N. J., has filed plans for its proposed plant additions, to consist of a three-story extension, 50 x 132 ft., to cost about $100,000, and a one-story brick boiler plant, 25 x 43 ft.

The Progressive Sheet Metal Co., 581 South Nineteenth Street, Newark, N. J., has filed notice of organization. Carl Schlesinger, 430 Davis Avenue, Arlington, N. J., heads the company.

L. Lawrence & Co., 292 Halsey Street, Newark, N. J., operating a copper-smithing works, has had plans prepared for a one-story plant, 48 x 150 ft., on Jefferson Avenue, Detroit, Mich., to cost $20,000.

The Rose Mfg. & Machine Co., 111 Hamilton Street, Newark, N. J., has filed notice of organization to manufacture machinery, parts, etc. Herman Rose, 88 Second Street, heads the company.

The Kelly-Dennin Co., Albany, is having plans prepared for a one-story machine shop and automobile service station, 150 x 150 ft., estimated to cost $50,000.

S. Wander & Sons, 135 Church Street, Albany, will erect a factory addition, 70 x 128 ft., three stories, of reinforced concrete and brick, from plans of architects Pember & Campaigne, 24 James Street, Albany, at an estimated cost of $50,000.

Buffalo

BUFFALO, Sept. 22.

The S-T Engineering Corporation, Buffalo, recently incorporated with a capitalization of $100,000, has secured offices in the Lockwood Building, Genesee and Franklin streets, and has elected Ralph McCarty president, Henry J. Turner vice-president, William B. Powell treasurer, and Harvey H. Hickman secretary and general manager. It will manufacture mechanical equipment and an overhead transportation system of track and trolleys for moving loads up to 5 tons. Mr. McCarty is now secretary of the Corrugated Bar Co., with which Mr Hickman has been associated for many years and more recently with the Ferguson Steel & Iron Co., Frederick G. Batchellor, a director of the new company, is manager of the Buffalo Pitts Co., manufacturer of tractors and steam-rollers.

Announcement is made of the formation of the Parenti Motors Corporation, Buffalo, incorporated for $2,500,000 to manufacture passenger automobiles of laminated or ply-wood construction, without the use of a steel frame. J. S. Parenti, formerly with the Fiat Automobile Co. of Italy, is president; W. K. Wishart is secretary and treasurer. Construction of a factory is being arranged for.

The Archer, Daniels Co., Buffalo River and Hamburg Turnpike, Buffalo, manufacturer of linseed oil, will add to its flaxseed crushing plant a two-story reinforced concrete press building, 72 x 84 ft. Bids are being taken. L. F. Beath is in charge.

The Buffalo Body Corporation, Buffalo, recently incorporated with a capitalization of $1,000,000 by K. B. Macdonald, formerly of the Curtiss Aeroplane Co., R. J. Mackenzie, W. R. Daniels and others, has completed arrangements for occupying the former plant of the American Seating Co., at Seneca and Lord streets and Fillmore Avenue, which it will equip for the production of steel bodies.

The U. S. Hame Co., Tonawanda Street and the New York Central Railroad, Buffalo, is taking bids for a brick and reinforced concrete blacksmith-shop addition, 51 x 60 ft.

The National Plyer Co., Buffalo, recently incorporated with a capital stock of $25,000 by K. B. Macdonald, 324 Ellicott Square Building, and W. R. Daniels, 903 D. S. Morgan Building, and others, to manufacture hardware specialties, etc., has established its plant in a two-story brick building at 11-15 Forest Avenue, corner of Niagara Street.

The Lockport Auto Radiator Corporation, Lockport, N. Y., has been incorporated with a capital stock of $30,000 by J. L. Branch, C. D. Nye and F. M. Capell.

The Rochester Folding Box Co., Rochester, Henry C. Stevenson secretary and treasurer, is having plans drawn for a two-story addition, 140 x 223 ft., to be erected at Elizabeth Avenue and the New York Central Railroad, at an estimated cost of $75,000.

The Davenport Machine Tool Co., Rochester, capitalized at $625,000, has been incorporated by W. S. Davenport, C. R. Burt and C. W. McKay.

The Gabrielson Mfg. Corporation, Syracuse, capitalized at $50,000, has received charter to manufacture milling machines, foundry and factory supplies. A. Meldrum, M. V. White and C. Gabrielson are the incorporators.

William H. Gutliph, Charles E. Knapp, John R. Sheldon and John Pickard, Syracuse, have incorporated the Gutliph-Knapp Pattern & Casting Co., with a capitalization of $25,000.

The Nypano Specialties, Inc., Niagara Falls, N. Y., has filed articles of incorporation to manufacture efficiency devices. J. E. Bossard, C. L. Webb and W. S. Smith are directors. The capital stock is $40,000.

The Perfect Auto Lock Corporation, Buffalo, has been incorporated with a capital stock of $125,000 by F. E. Ford and F. G. Safee, to manufacture special locks and locking devices.

The Federal Metal Hose Corporation, Buffalo, has been incorporated with an active capital of $78,750 by I. W. Smith, C. C. Baysor and C. Palmer to manufacture metal hosing, etc.

Following its change of name from the Selden Truck Sales Co. to the Selden Truck Co., 49 East Avenue, Rochester, N. Y., manufacturer of motor trucks, the company has filed notice of reorganization with an active capital of $1,450,000.

A. Arthur Lane, Rochester, N. Y., has acquired property at 209 Clinton Avenue, North, and will remodel an existing structure for extensions to his automobile repair shop and service works.

The Buffalo Nipple & Machine Co., 335 Glenwood Avenue, Buffalo, has filed plans for its proposed two-story addition, 39 x 76 ft., at Glenwood Avenue and Dupont Street, to cost about $10,000.

The Jinkner Mfg. Co., Buffalo, has been incorporated with a capital stock of $200,000 by J. F. and G. A. Jinkner and H. Yousett, to manufacture airplanes, motor parts, etc.

The Francis Metal Door & Window Corporation, Rochester, N. Y., has been incorporated with a capital stock of $25,000 by I. M., A. W. and G. D. Francis, to manufacture metal doors, sashes, etc.

The Wheeler Green Electric Co., 29 St. Paul Street, Rochester, N. Y., manufacturer of electric motors, etc., has filed plans for an addition, 40 x 40 ft., to cost $19,000.

The Mobilex Accessory Co., Jamestown, N. Y., has been incorporated with a capital stock of $25,000 by A. Fred Tunberg, Albert Wedeborg and W. Ernest Tiffany, 43 Blanchard Street, to manufacture automobile equipment.

The Inland Marine Corporation, Syracuse, N. Y., has been incorporated with a capital stock of $100,000 by D. E. Alvord, B. E. Shove and M. S. Melvin, to manufacture marine equipment.

Within the next 30 days the Stewart Motor Corporation, Buffalo, will move into its new plant, which covers nine acres and will materially increase the company's capacity. From a small beginning in 1912, the corporation has progressed rapidly as one of the leaders in truck manufacture. At the regular meeting of the board a quarterly dividend of 2 per cent on preferred and 2½ per cent on common stock was declared.

New England

BOSTON, Sept 22.

The demand for machine tools is relatively brisk and prices continue to average higher. The advance is irregular, however. For example, of those concerns which reduced prices several months ago some have restored one part of their product to previous figures, while other lines are still down and only partly restored.

Fire arms manufacturers are almost unprecedentedly busy, especially makers of ordinary revolvers, shotguns and sporting rifles of what are known as medium grades. Some firms are unable to keep up with deliveries, and attribute the condition to the demand from returned soldiers for fire-arms for sporting purposes.

The tendency to install labor-saving devices to combat high wages, shorter hours, and strike threats is observed more and more. Even the scrap yards, whose employees have recently been demanding and obtaining high wages, are buying handling equipment. For instance, J. Lipsitz, Chelsea, Mass., scrap iron and steel, has just purchased two Orton & Steinbrenner cranes and two Cutler-Hammer Mfg. Co. lifting magnets, one set to be placed in the Chelsea yard, the other in its yard at Lebanon, Pa. The Cutler-Hammer Co. also sold a lifting magnet to the Beacon Oil Co., Everett, Mass., and one to the Leonard Construction Co., Chicago, for handling structural steel.

The National Acme Co., through its Boston office, recently sold four automatic screw machines to the Duckworth Chain Co., Springfield, Mass.; also machines to the Whitney Mfg. Co. and the American Bosch-Magneto Co., Springfield. New industries soon to figure on equipment are the Hub Electric Steel Casting Co., which is to build a plant in South Boston, and the Union Soda Fountain Co., which will manufacture soda fountain apparatus in Allston, a suburb of Boston.

The Rowe Calk & Chain Co., Plantsville, Conn., has taken over the business of the Hi-Lo-Jack Co., Worcester, Mass., manufacturer of lifting jacks.

The New Departure Mfg. Co., Bristol, Conn., manufacturer of bearings, steel balls, etc., has acquired an existing building at Meriden, Conn., with adjoining site, for the establishment of a branch plant. The present structure will be remodeled and two new factory buildings will be erected. Lockwood, Greene & Co., Boston, Mass., are the engineers.

The Black Rock Silver Mfg. Co., Bridgeport, Conn., has been incorporated with a capital of $25,000 by Nathan Bittner, 2957 Fairfield Avenue, and Philip Novak, 1790 Stratford Avenue, to manufacture machinery, electro-plating specialties, etc.

The Rhode Island Machine & Tool Co., Woonsocket, R. I., recently incorporated with a capital of $100,000 to manufacture machinery and tools, has been organized with H. Eugene Getchell as president; Raynaldo Jacques, vice-president; Arthur Jacques, secretary and treasurer; and Wilfred Jacques, general manager.

Doran Brothers, River Street, Danbury, Conn., manufacturer of hatters' machinery and equipment, will build a new one-story machine shop on South Street, 90 x 200 ft., to cost about $50,000, including machinery.

The Franklin Electric Mfg. Co., Hartford, Conn., has filed notice of dissolution. The Westinghouse Lamp Co., 165 Broadway, New York, is interested in the company.

The Consolidated Motor Car Co., Bradford, Conn., has been incorporated in Delaware with capital stock of $750,000 by Albert E. and Bert E. Lazaro, and Frank J. Kenny, all of Bradford, to manufacture automobiles.

The Fulford Mfg. Co., Summer Street, Providence, R. I., manufacturer of metal specialties, is having plans prepared for the erection of a two-story extension, 154 x 210 ft., with part of the structure to be used for automobile service and garage work. It will cost about $60,000. W. R. Walker & Son, 17 Custom House Street, are architects.

The Phillips Time Switch Co., 159 Coram Avenue, Shelton, Conn., recently incorporated, has been organized with L. W. Holmes as president; Ross M. G. Phillips, vice-president; C. F. Holmes, secretary; and John H. Shaw, treasurer.

The Electric Maintenance & Engineering Works, 143-45 Railroad Street, Woonsocket, R. I., has filed notice of organization to manufacture electrical specialties. Arthur Dauray, Jr., 186 Harrison Street, heads the company.

Adding machines for the Federal Adding Machine Co., 251 Fourth Avenue, New York, are being manufactured at the plant of the Colt's Patent Fire Arms Mfg. Co., Hartford, Conn. The Federal company recently acquired the business of the White Adding Machine Co., including patents and equipment.

The Electric Parts & Service Co., 1271 Main Street, Hartford, Conn., has filed notice of organization to manufacture electrical and mechanical equipment. C. H. Schrag, Ashford Street, heads the company.

The New Haven Machine Co., 179 Milford Turnpike, New Haven, Conn., has taken bids for the erection of a new two-story machine shop, 44 x 100 ft., at West Haven.

The Bryant Electric Co., Hancock Avenue, Bridgeport, Conn., has filed plans for the construction of the proposed four-story addition to its plant, 60 x 220 ft., to cost about $130,000, including equipment. The company specializes in the manufacture of electrical switches, etc.

Philadelphia

PHILADELPHIA, Sept. 22.

The Sharples Specialty Co., Stokley and Westmoreland streets, Philadelphia, has filed plans for a one-story brick machine shop, 75 x 144 ft., to cost $35,000.

The General Fire Extinguisher Co., Stock Exchange Building, Philadelphia, has acquired the factory at the corner of Sedgley Avenue and Seventeenth Street, on property 100 x 193 ft., for a consideration of $30,000. The company now operate a branch works at this location. Headquarters are at Providence, R. I.

The Haney-White Co., Glenwood Avenue and Twenty-first Street, Philadelphia, manufacturer of planing-mill products, has taken title to the former plant of the Crompton & Knowles Loom Works, Glenwood Avenue, near Sixteenth Street, which this company recently arranged to vacate, for the establishment of a new plant. The property totals 312 x 500 ft., and is assessed at $130,000.

The Quartermaster Department, United States Government, Philadelphia, has received a low bid from Barclay White & Co., 1713 Sansom Street, for the erection of a machine shop at the gun plant of the Midvale Steel & Ordnance Co., Nicetown, at $225,000.

The Atwater Kent Mfg. Works, Philadelphia, manufacturer of ignition equipment, has taken title to the factory buildings now occupied at the corner of Stenton Avenue and Logan Street, for a consideration of $222,186.

The May Foundry Co., Sixty-first Street and Eastwick Avenue, Philadelphia, manufacturer of iron and steel castings, has been incorporated in Delaware with capital stock of $150,000.

A power plant for works service will be constructed by the Notaseme Hosiery Co., Mascher Street, Germantown, Philadelphia, in connection with its mill to be erected at Atlantic and I streets.

The Haverford Cycle Co., 503 Market Street, Philadelphia, has purchased the plant of the Savage Arms Corporation at Erie Avenue and Sepviva Street, which has been held for sale at $500,000. The property comprises about 7½ acres of land, with 7 plant buildings and power plant. It was acquired by the Savage Arms Corporation from the Isaac A. Sheppard Stove Works during the war period. The new owner will equip it for the manufacture of motorcycles and bicycles, and will give employment to about 1500 persons. The plant will be run under the name of the Ace Motorcycle Mfg. Co. Max M. Sladkin is president of the Haverford company.

The Barcalo Mfg. Co., 225 Louisiana Avenue, Buffalo, manufacturer of brass and metal beds, has secured property near Front and Poplar streets, Philadelphia, for the establishment of a new branch plant to be devoted primarily to assembling work.

The Albro Clem Elevator Co., D and Erie streets, Philadelphia, has filed plans for a one-story brick machine shop, 78 x 118 ft., at the corner of D Street and Allegheny Avenue, to cost $13,000.

The Wicaco Screw & Machine Works, Inc., Seventh and Wood streets, Philadelphia, has acquired property at the northeast corner of Louden and Stenton avenues, 250 x 350 ft., heretofore held by the American Metal Works. The new owner plans for the erection of a plant on the site at a cost of about $100,000.

A boiler plant to cost $14,000 will be erected by the Caledonian Dye Works, Emerald and Westmoreland streets, Philadelphia, at Cornwall and Emerald streets.

The Modern Mfg. Corporation, Philadelphia, has been incorporated in Delaware, with capital stock of $550,000, by Charles H. Kors and Samuel W. Salis, Philadelphia; and Frederick Taylor, Hagerstown, Md., to manufacture metal and wire products, gears, etc.

A new one-story brick boiler plant, 50 x 70 ft., will be erected by the American Preserve Co., 946 Beach Street, Philadelphia, in connection with its new factory.

The Benjamin Eastwood Co., 300 Straight Street, Paterson, N. J., manufacturer of silk-mill machinery, looms, etc., has acquired property on Allen Street, Allentown, Pa., for the establishment of a branch plant.

Fire Sept. 17 destroyed the plant of the Sall Mountain Co. Scranton, Pa., manufacturer of asphaltic roofing, etc., comprising four works buildings, with a loss estimated in excess of $100,000. Headquarters of the company are at 230 South La Salle Street, Chicago. The same fire also damaged portions of the plants of the Elmore Jig Co. and the Gaylord Engineering & Construction Co., in this vicinity.

The Merchant Shipbuilding Corporation, 120 Broadway, New York, is arranging to specialize in the production of tank steamers at its Chester, Pa., plant.

The E. T. Fraim Lock Co., Park Avenue, Lancaster, Pa., manufacturer of locks, safes, etc., has had plans prepared for a one-story machine-shop addition, 44 x 82 ft.

Baltimore

BALTIMORE, Sept. 22.

In connection with extensions proposed by the Union Shipbuilding Co., Baltimore, it is understood that the cost will involve about $8,000,000, instead of $4,000,000. It is now stated that the company plans to build six concrete ways. The capacity of the plant will be about doubled. A rearrangement of property has been made by the city to give the company some additional ground it required.

Joseph Lotz, 235-237 South Clinton Street, Baltimore, will build a one-story brick garage, 170 x 60 ft., to cost $8000.

The Maryland Color Printing Co., Holliday and Hillen streets, Baltimore, will install 600 hp. in motors.

The Dreadnaught Tire & Rubber Co., Eager and Fifth streets, Baltimore, manufacturer of automobile tires, will build a one-story plant addition, 33 x 87 and 30 x 40 ft., to cost $4000.

The Norfolk Electric Mfg. Co., Norfolk, Va., is planning to build a plant for the manufacture of induction motors of from 1 to 5 hp. Prices are wanted on machine tools, ovens,

bolts, etc. P. O. Sutton, 215 Cumberland Street, Norfolk, is general manager.

I. H. Fann, Milledgeville, Ga., will establish a machine repair shop.

The Ford Service Station, St. Petersburg, Fla., will build a garage and machine shop to cost $11,000. O. R. Albright is manager.

Posey & Whiteley Engineers, Inc., 1106-7 Fidelity Building, Baltimore, has been incorporated by James Posey and Stockett M. Whiteley, consulting and operating engineers, for industrial power-plant management and the economical operation of plants using coal for power or heating.

In a report made to the Board of Estimates, Baltimore, Water Engineer Lee recommends the construction of a new waterworks for additional water capacity for the city, aggregating 200,000,000 gal. a day, at an estimated cost of $8,000,000. The work will include a number of pumping plants to cost about $280,000, with pumping machinery; a mechanical filtration plant, estimated to cost $2,700,000 with mechanical and electrical installation. If the entire project is carried out as planned the total cost will be $24,752,000, including dam construction at New Gunpowder Falls, tunnel building and other work, with new gravity pipe lines to cost $5,000,000.

The Curtis Bay Copper & Iron Works, Baltimore, subsidiary of the United States Industrial Alcohol Co., is devoting the larger part of its works to the repair and rebuilding of tank cars and ships.

The duPont Motor Mfg. Corporation, Commerce Street, Wilmington, Del., has filed plans for a new machine shop to cost $20,000. This is the first of several such buildings to be erected, which will use the plant for the manufacture of automobiles. The company is also planning for the erection of an assembling and finishing plant, to be located either at the present site or at a convenient point outside the city limits.

The Bethlehem Shipbuilding Co., Wilmington, Del., is planning to reduce the working force at the Harlan plant within the next month or six weeks. It is said that about 800 men will be laid off, pending the taking on of additional shipbuilding contracts. The company is now giving employment to a total of 5366 men at the yard.

The Standard Automatic Mine Door Co., Dante, Va., manufacturer of metal mine doors, etc., has increased its capital stock from $50,000 to $100,000.

The Town Council, Murphy, N. C., has plans under way for a hydroelectric power plant for city service, to cost with equipment about $75,000. W. C. Ostwalt is engineer.

The T. & H. Motor Co., Greensboro, N. C., has been incorporated with a capital of $100,000 by C. L. Howard, H. L. Frazier and E. D. Webster to manufacture motor trucks.

The new plant of the Lanham Cotton Cultivator Co., Empire Building, Atlanta, Ga., to be used for the manufacture of cotton and agricultural equipment, will comprise a machine and erecting shop, 50 x 120 ft.; forge shop, foundry, woodworking plant and other mechanical departments. A boiler plant will also be erected, as well as a two-story office building. The company has secured a site, 200 x 480 ft.

The Motor Activator Corporation, Roanoke, Va., has been incorporated with a capital stock of $25,000 to manufacture motor trucks. Roy F. Dowdy is the principal incorporator.

The Muscogee Roll & Cot Co., Macon, Ga., has been organized to manufacture rolls for machinery, and other metal specialties. A. A. Drake is president.

The Portsmouth Coal & Ice Co., Portsmouth, Va., will electrify its ice-manufacturing plant, replacing present steam operation. Henry B. Reardon, Jr., Bankers' Trust Building, Norfolk, Va., is the engineer.

The Norfolk Electric Mfg. Co., Norfolk, Va., has been incorporated with a capital stock of $15,000 to manufacture electrical supplies and equipment. Frederick W. Walter is president.

Pittsburgh

PITTSBURGH, Sept. 22.

The Oliver & Snyder Steel Co., Tenth and Muriel streets, Pittsburgh, has awarded a contract to D. T. Riffle, Keenan Building, for a one-story addition to its plant at Uniontown, 44 x 64 ft., to be used as a crusher house and conveyor building. A one-story boiler plant will also be erected. Henry Oliver is president.

The Blum Safety Razor Co., Johnstown, Pa., has been incorporated with capital stock of $50,000 by T. J. Callete, Harry Silverstone and Harry Blum to manufacture safety razors, cutlery, etc.

The Pittsburgh Galvanizing Co., Pittsburgh, will not be able to build its proposed new plant at Hill and Pitt streets, Wilkinsburg, Pa., as planned. The Borough Council has refused permission for the plant, holding that it would not be desirable in this section. The company has sought an injunction against the action, but the Common Pleas Court, Pittsburgh, has denied the application. It is said that another location will be selected.

The Union Steel Casting Co., Pittsburgh, has filed plans for extensions and improvements in its foundry at 6100 Butler Street, devoted to the production of steel castings, to cost about $27,400.

The Pittsburgh Model Engine Co., Thomas Boulevard, Pittsburgh, has awarded a contract to R. H. Van Ormer, 7030 Frankstown Avenue, for a one-story addition, 33 x 93 ft., to cost $20,000.

The Grant Garage & Service Co., Grant Street, Pittsburgh, has filed plans for extensions and alterations in a brick building at Grant Street and First Avenue, to form a new repair works and service building, at a cost of $45,000.

The Pittsburgh Gage & Supply Co., Liberty Avenue, Pittsburgh, manufacturer of washing machines, mechanical specialties, etc., has filed plans for a six-story reinforced-concrete addition, 149 x 174 ft., to cost $150,000.

The Pittsburgh Plate Glass Co., Pittsburgh, is planning for the erection of a new branch establishment at Omaha, Neb., to cost about $400,000.

The Elkins Garage Co., Elkins, W. Va., is planning for a new repair works and service building, 90 x 150 ft., at Fourth and Davis streets, to cost $40,000.

The Kanawha & Hocking Coal & Coke Co., Carbondale, W. Va., is planning for a new coal tipple at its local plant, known as Plant No. 111.

The Service Garage Co., Williamson, W. Va., is planning for a two-story and basement repair shop and service works, 50 x 100 ft. G. B. Irvin is president.

Cleveland

CLEVELAND, Sept. 22.

There has been some slowing down the past week in the demand for machine tools. The announcement that a strike in the steel plants would be called, proved a disturbing factor and numerous manufacturers who were figuring on the purchase of additional equipment, state that they will not place orders until the situation clears. Some local machine tool builders, however, report that the volume of business does not show any falling off. This is particularly true of makers of automatic screw machines and turret lathes.

The demand for small lots of machines comes principally from the automobile and rubber industries. The General Motors Corporation is placing orders for a large amount of equipment required for its Walkerville, Ont., plant, and the White Co., Cleveland, placed orders the past week for some additional machines. The B. F. Goodrich Rubber Co. is inquiring for six 42-in. vertical boring mills. Two inquiries for round lots of machines from the Firestone interests in Akron are still pending. The Foster Bolt & Nut Co., Cleveland, also placed orders the past week for several machine tools.

The Champion Machine & Forging Co., Cleveland, maker of drop forgings, will enlarge its plant and install additional machinery, involving an expenditure of approximately $500,000. Contracts have been placed, and it is expected that the extensions will be completed by Jan. 1. At a recent meeting of the stockholders an increase in the capital stock from $250,000 to $1,000,000 was authorized.

The Lake Erie Steel & Wire Co., Cleveland, has increased its capital stock from $75,000 to $225,000, to provide for extensions. It is at present engaged in the manufacture of cold drawn steel in wire sizes, but will enlarge its plant by an addition, 50 x 180 ft. and install equipment for the manufacture of cold drawn steel in sizes up to 3 or 4 in. in carbon and alloy steels.

The Torbensen Axle Co., Cleveland, has had plans prepared for an addition providing 15,000 sq. ft. of floor space.

The Jordan Motor Car Co., Cleveland, has purchased the adjoining plant of the Metal Parts Mfg. Co., which it will occupy for manufacturing purposes.

The F. P. Screw Co., 2279 East Seventy-seventh Street, Cleveland, has placed a contract for the erection of a one-story factory, 80 x 150 ft.

The Metal Plating Co., Cleveland, will erect a one-story factory, 34 x 90 ft.

The Russ Mfg. Co., Cleveland, plans the erection of an addition at an estimated cost of $96,000.

The Toledo Machine & Tool Co., Toledo, Ohio, has commenced the erection of a new plant to be operated in connection with its present works on a 22-acre site acquired some time ago, and which will include a foundry 153 x 378 ft., and machine shop, power house and other buildings. It is stated

that approximately $400,000 will be spent on the first units which will be used for making the heavier types of presses.

The DeVilbiss Mfg. Co., Toledo, Ohio, has increased its capital stock from $700,000 to $2,000,000 to provide for extensions, and take care of increased business. It has purchased the property of the Lenk Wine Co., including a 20-acre site and several buildings, a part to be remodeled for factory purposes.

The Bean Spring Mfg. Co., Canton, Ohio, recently organized to manufacture automobile springs, has commenced the erection of a plant on Columbia Heights, Massillon, to include a main building, 80 x 363 ft., which is expected to be ready for operation in November. J. F. Bean is head of the company.

The Westinghouse Electric Products Co., Mansfield, Ohio, will enlarge its plant by the erection of a six-story addition providing about 80,000 sq. ft. of floor space, or doubling the capacity of the present works. The extension will be used for the manufacture of heating appliances, electric irons and allied products.

The Thomas & Armstrong Co., London, Ohio, is erecting a sheet metal-working shop, one-story, 50 x 340 ft.

The Wadsworth Foundry Co., Wadsworth, Ohio, will build a foundry at a cost of $30,000 to replace one recently destroyed by fire.

Milwaukee

MILWAUKEE, Sept. 22.

Export requirements are developing on a substantial basis and are an encouraging feature of the machine tool situation. Domestic business is also undergoing notable expansion, local shops having reached the point where increased capacity is required to handle orders promptly. This is particularly true of milling machines and shapers. The growth of malleable and gray iron foundries continues. Steel founders report that business is picking up after a lull.

The Chain Belt Co., Milwaukee, manufacturer of malleable and steel transmission chains, concrete mixers and paving outfits, traveling water screens, and elevating and conveying equipment, has increased its capital stock from $1,000,000 to $2,800,000, and is entering upon an extensive enlargement program which eventually will mean the concentration of its foundries and machine shops at Thirty-ninth Avenue and Orchard Street, in West Milwaukee, where a malleable shop has been in operation for about two years and a 23-acre site is available for future extensions. Within a year or two the main works at Park Street and the Sixteenth Street viaduct, in the Menomnee Valley, will be transferred to the new site. The first work on the new project will be undertaken immediately, contracts having been awarded for the erection of a brick and steel building, 150 x 316 ft., adjacent to the malleable foundry, 80 x 506 ft., in West Milwaukee. The new building will be used temporarily as an assembling floor, but is designed for quick conversion into a casting shop. The company is in the market for one 15-ton and two 5-ton cranes and miscellaneous machinery and equipment. The project is in charge of G. P. Singer, engineer, Chain Belt Co., and Frank D. Chase, Inc., Chicago, consulting engineer. C. Raymond Messinger is vice-president and general manager.

The Milwaukee Shaper Co., Milwaukee, manufacturer of shapers, has acquired 30,000 to 35,000 sq. ft. of extra floor space and is doubling its capacity, at the same time consolidating its works formerly located at 1148 Holton Street, 518 Prairie Street and 415 Chestnut Street. The new plant is at 1029-1031 Cold Spring Avenue and 382-400 Eleventh Street. New equipment costing about $20,000 has been purchased and is now being installed. The capital stock of $75,000 is being increased to $150,000, and the officers are: President, Richard V. Werner; vice-president, William F. C. Schroeder; second vice-president and general superintendent, John E. Kraner; treasurer and general manager, Edward H. A. Schroeder; secretary, Jacob Moerschel. In addition to a large number of domestic orders on its books, the company the past week received orders for nine machines for European delivery and one for four machines for Calcutta, India.

The Continental Axle Co., Edgerton, Wis., incorporated with a capital stock of $200,000, has perfected its organization by the election of the following officers: President, Andrew McIntosh; vice-president, James Higgins, Racine, Wis.; secretary, E. Z. Menhall; treasurer, William McIntosh; general manager, James W. Menhall. Ground has been broken for a one-story machine shop and assembling floor, 68 x 290 ft., to be ready Nov. 10, and equipped for manufacturing motor truck, tractor and trailer axles.

The Molle Typewriter Co., Oshkosh, Wis., is purchasing a miscellaneous list of tools, including automatics, which are required to increase the capacity from 15 to 30 machines a day by Nov. 1. At the annual meeting R. D. Wynn, general manager, was elected president, succeeding the late J. E. Molle. William Molle is vice-president; Mrs. L. M. Molle, secretary and treasurer; Charles A. Bolling, works manager, and Clyde Starring, superintendent.

The Winther Motor Truck Co., Kenosha, Wis., has obtained an option on a factory site in Milwaukee, on which it expects to establish branch works costing $250,000. No further information will be divulged at this time.

The Lewis Steel Products Co., Toledo, Ohio, has engaged Alfred C. Clas, architect, Colby-Abbot Building, Milwaukee, to design a foundry, machine shop and office building addition, 150 x 360 ft., of brick and steel construction, estimated to cost $250,000 with equipment. Work will begin at once. Angelo R. Clas is president and general manager.

The Kewaskum Aluminum Co., Kewaskum, Wis., a new corporation with $150,000 capital stock, does not expect to erect its new plant until next spring. Foundations, however, will be laid this fall. An initial investment of $50,000 to $75,00 in buildings and machinery for producing aluminum stamping and drawn ware is planned. B. H. and L. P. Rosenheimer of Kewaskum are the principals.

The International Harvester Co. will enlarge its Milwaukee works at Fourteenth Avenue and Park Street by the erection of a one-story addition, 120 x 126 ft., of brick, steel and concrete, at an estimated cost of $50,000.

G. W. Johnson, Chippewa Falls, Wis., formerly general superintendent Chippewa Foundry & Machine Co., is establishing a machine shop in association with DeWitt Yates, to manufacture pumps and engines designed by Mr. Johnson. A brick shop is being erected on the Milwaukee and "Soo Line" tracks which will cost about $25,000 with equipment.

Nicholas Remmer, Kewaskum, Wis., is reorganizing his foundry and machine shop business as a corporation, which when perfected will provide increased capacity in all departments of the plant.

The Machine Products Co., Milwaukee, has been organized by Jay J. Van Vechten, Leo A. Radwick and Oliver W. Bow, attorney, to manufacture metal products. It is capitalized at $10,000.

The Horizontal Hydraulic Hoist Co., Milwaukee, will erect a one-story addition, 30 x 50 ft., at Twenty-fifth Street and St. Paul Avenue.

E. G. Panniér & Son, Chippewa Falls, Wis., manufacturers of agricultural implements, are contemplating the erection of a new factory, 125 x 200 ft., one story, of brick and steel, at 908-916 North Prairie Avenue. An engineer has not yet been selected.

The Ajax Auto Parts Co., Racine, Wis., has plans for a one-story brick and steel addition, 65 x 120 ft., at Fifteenth Street and the Chicago & Northwestern tracks, which with new equipment will cost about $50,000.

The Board of Education, Oconomowoc, Wis., has engaged Parkinson & Dockendorff, architects, LaCrosse, Wis., to design a two-story brick and concrete high school, 122 x 187 ft., with manual training department. Bids will be taken early in October. Fred Holt is secretary.

Chicago

CHICAGO, Sept. 22.

The Barber-Greene Co., manufacturer of B-G standardized belt conveyors and B-G self feeding bucket loaders, Aurora, Ill., is building an addition, 90 x 180 ft., to be used as an assembling department. This is the second extension to be erected this year and is made necessary to keep up with orders and furnish prompt deliveries.

The Albright-Nell Co., 5323 South Western Avenue, Chicago, manufacturer of machinery, will build a one-story addition, 140 x 200 ft., to cost about $75,000, including equipment.

The Minneapolis Steel & Machinery Co., Minneapolis, Minn., is having plans prepared for a new one-story foundry at University and Twenty-sixth avenues, S. E., to cost about $50,000.

The Gottschau Steam Motors Co., Denver, Colo., has been incorporated in Delaware with capital of $5,000,000 by Christian E. Gottschau, Earl H. Lehr, Chicago; and Mason R. Mackinstry, Denver, Colo.; to manufacture steam engines, motors, etc.

The American Insulated Wire & Cable Co., 954 West Twenty-first Street Chicago, will make extensions and improvements in its buildings at Twenty-first and Morgan streets, to cost about $15,000.

The United Iron Works, Kansas City, Mo., manufacturer of machinery and equipment for oil and mining operations, has arranged for a bond issue of $1,500,000. The company is now operating seven plants in different parts of the country and is said to have orders ahead to insure capacity operations for the next six months. Charles H. Cole is president.

The Eagle Foundry Co., Minneapolis, Minn., associated with the J. W. Bryant Co., is having plans prepared for the erection of a new one-story foundry, 65 x 120 ft., on Twenty-sixth Street, to cost about $50,000, including equipment. H. D. Asleson, 3055 Fifteenth Avenue, South, is engineer.

The Saul Ginsburg-Gains Mfg. Co., automobile accessory manufacturer, will construct a four-story plant at Twenty-first Street and the Pennsylvania tracks, Gary, Ind., and employ 2000 workmen.

The Rocky Ford Milling & Electric Co., is located at Manhattan, Kan., and not Rocky Ford, as was erroneously stated in these columns Sept. 18. It will build a power plant in what is known as the Rocky Ford district in that section. J. C. Jacobson, Minneapolis, Minn., is the architect and engineer.

St. Louis

ST. LOUIS, Sept. 22.

The Hickory Hill Mining Co., William R. Thompson manager, Lehigh, Okla., is reported in the market for about $20,000 worth of mining and power plant equipment.

The Arcola Gin Co., Arcolo, Miss., John A. Aldridge manager, is reported in the market for about $30,000 worth of equipment.

The Jackson Light & Traction Co., Jackson, Miss., L. O. Gordon manager, will improve its electric generating plant. Plans are not completed.

The Greater Oklahoma Oil Corporation, Billings, Okla., G. B. Sherritt, president, will install one 75-hp. steam engine and one 200-kw. generator complete.

The Sulphur Ice, Light & Power Co., Sulphur, Okla., will install about $30,000 worth of additional machinery.

The Bender Iron & Supply Co., Shreveport, La., will equip a machine shop at a cost of about $50,000.

The Busch-Sulzer Bros.-Diesel Engine Co., St. Louis, will erect an additional building.

The Landis Machine Co., St. Louis, will build an addition at a cost of $250,000 for the manufacture of shoe and harness machinery.

The Magna Oil & Refining Co., Tulsa, Okla., capital stock $10,000,000, H. Appleman, A. J. Lewis and L. Olsen interested, will equip oil refining plants and improve others to be purchased.

The St. Bernard Cypress Co., Arabi, La., J. J. Vetter manager, will install electric conveying equipment.

The Johnson-Harlow Lumber Co., Clarksdale, Miss., will improve its plant, installing individual electric motors and other improvements.

The St. Louis Metal Ware Co., St. Louis, R. L. Niedringhaus president, will erect a new building, 220 x 360 ft.

The St. Louis Pressed Steel Co., capital $500,000, incorporated by T. L. Choteau, S. E. McKenzie and H. E. Knox, all of Wilmington, Del., will equip a plant for manufacturing pressed steel products.

The Foster Log Loader Mfg. Co., Little Rock, Ark., will equip a plant for the manufacture of a log loading device.

Albert Weiblen Marble & Granite Co., 505 City Park Avenue, New Orleans, La., is reported in the market for an electric traveling crane of 50 ft. span.

The Positive Lock Nut Co., Colgate, Okla., has been incorporated in Delaware with capital of $100,000 by F. F. Green, Colgate; H. Wortman, Cincinnati, Ohio, and E. S. Hudson, Covington, Ky., to manufacture special lock nuts and kindred products.

W. C. Norris, manufacturer of oil well pumping supplies, Tulsa, Okla., has let contract for a new forge and machine shop, of reinforced concrete, which will double the capacity of its plant. Bulldozers, forging machines, shears, lathes, drill presses, shapers, etc., in addition to the present equipment will be installed about Nov. 15.

Detroit

DETROIT, Sept. 22.

While considerable quantities of Government machine tools and supplies have been sold in this district, sales have not been large enough to affect the trade in general. Dealers are optimistic regarding the outlook.

The Union Truck Co., Bay City, has secured a site of 42 acres for its new plant in the Riverside Park section upon which buildings will be erected.

The Erdman-Guider Co., Detroit, maker of automobile bodies and capitalized at $500,000, will move its plant to Saginaw, and occupy the works formerly used by the Bransfield-Billings Co., which contains 300,000 sq. ft. of floor space. Arno R. Guider is president.

The Southwick-Pom Co., manufacturer of commercial motor car bodies, has been purchased by the Bennett-Oustrich Co., which will continue the business at the present location, 472 Lafayette Boulevard, Detroit.

It is expected that the Holmes Foundry Co.'s new plant in Port Huron, Mich., will be ready for operation by Oct. 1. The old plant was destroyed by fire about six months ago.

The Albion Bolt Co., Albion, Mich., which is said contemplated moving to Jackson, Mich., will remain in Albion, arrangements having been made to occupy the plant of the Albion Chemical Works. As soon as the new quarters are available, the company will add to its facilities for making bolts and nuts, all of which are taken by the Hayes Wheel Company, of Jackson.

The Abbey-Scherer Co., Detroit, manufacturer of wire and wire products, has purchased a site, 50 x 350 ft. on Horation Street, and will build a new plant.

Joseph Baker's, Ltd., Woolworth Building New York, has purchased from the Alien Property Custodian the plant of the Werner & Pfleiderer Co., Saginaw, Mich., manufacturer of mixing and bakers' machinery, and will spend about $500,000 in enlarging its manufacturing facilities.

The Parish Mfg. Co., Seventh and Chestnut streets, Reading, Pa., manufacturer of automobile axles, etc., has awarded contract to the Austin Co., Penobscot Building, Detroit, for the erection of a one-story addition to its branch plant on Mount Elliott Street, Detroit, 98 x 260 ft., to cost about $76,000, including equipment.

The Michigan Machine Co., Sixteenth and Porter streets, Detroit, manufacturer of cash registers, is planning for the erection of a three-story plant, 107 x 158 ft., to cost about $150,000. Brown & Preston, Empire Building, are the architects.

Fire, Sept. 12, destroyed a portion of the foundry of the Burnett Foundry Co., Petoskey, Mich., with loss reported at $15,000.

The Paige Detroit Motor Car Co., Fort Street, Detroit, is taking bids for the erection of an addition to its machine shop at Warren Avenue and Lonyo Road.

The Detroit Twist Drill Co., Fort Street and Fourteenth Avenue, Detroit, is having plans prepared for the erection of a three-story addition, 45 x 87 ft.

The Detroit Pressed Steel Co., Detroit, has been incorporated in Delaware with a capital of $12,500,000 by Robert B. Hoyt, Gross Park, Mich.; Carl H. L. and Rudolph F. Flintermann, Detroit, to manufacture steel and iron products.

The Enterprise Foundry Co., 1127 Warren Avenue, Detroit, is taking bids for the erection of a one-story foundry and general works addition, 50 x 80 ft. Charles W. Crolin is president.

The Monarch Foundry Co., Greenwood Avenue, Detroit, is having plans drawn for a new one-story foundry, 100 x 200 ft., at Herrick Street and Vernor Avenue, for the production of gray iron castings.

The Detroit Manufacturers' Syndicate, Detroit, has been incorporated in Delaware with a capital of $1,000,000 by Robert L. Bailey, John W. Swartz and E. D. Miser, all of Detroit, to manufacture aircraft, airplane parts, motors, etc.

Cincinnati

CINCINNATI, Sept. 22.

The machine tool business shows signs of slowing down. This may be attributed to the uncertain labor conditions, but builders are using every effort to fill orders in hand. Automobile manufacturers continue the largest buyers. Export business is only moderately good, although a fair number of orders for lathes are coming in. Makers of shaping machines also report inquiries from England, France, Belgium and the Scandinavian countries. No recent business has been received from Italy.

On Sept. 18 a strike was called at the plant of the Printing Machinery Co. Up to date only two local metal-working plants are affected by strikes, the Cincinnati Screw Co. being the first to have trouble. At this plant more than half of the old employees have returned to work. A strike of several months' duration is still on against the Hamilton Machine Tool Co., Hamilton, Ohio, although the company is able to operate at more than one-half capacity.

Local and nearby jobbing foundries are very busy, but a few of them have had trouble on account of an insufficient coke supply.

The Cincinnati Milling Machine Co., has had plans prepared for a five-story addition, 70 x 175 ft., to its plant in Oakley to be used mostly for storage purposes.

Contract has been awarded for an addition to the plant of the Modern Foundry Co., Oakley-Cincinnati, recently mentioned as contemplated.

The Corcoran-Victor Co., Cincinnati, maker of automobile lamps and other specialties, has let contract for an addition to its plant on Reading Road.

The Dayton Metal Products Co., Dayton, Ohio, has increased its capital stock from $200,000 to $6,000,000. The company recently purchased the Wright Airplane Co.'s factory in West Dayton, and is erecting two buildings, of the same size as the original factory.

The Dayton Pipe Coupling Co., Dayton, Ohio, is erecting an addition to its plant, 90 x 120, one-story, to be used to house the forge department.

The Automatic Metal Products Co., Springfield, Ohio, will soon be incorporated by Wilbur J. Myers and others and will equip a plant for manufacturing bolts, nuts and metal specialties.

The Robbins & Myers Co., Springfield, Ohio, has established a branch plant at Xenia, Ohio, to be used mainly for winding armatures.

The Atlas Brass Foundry Co., Columbus, Ohio, has increased its capital stock from $65,000 to $155,000.

The Hyatt Ignition Co., 600 North High Street, Columbus, Ohio, whose incorporation was recently noted, intends to equip a plant for the manufacture of a new spark plug. J. M. Armstrong is president.

The Raber & Lang Mfg. Co., Kendallville, Ind., has increased its capital stock from $98,000 to $300,000 and will increase the capacity of its plant. The company manufactures concrete mixing machinery, sewer pipe molds and manure spreaders.

The Atlanta Producing & Refining Co., Atlanta, Ga., recently incorporated with a capital of $1,500,000, is planning for the erection of an addition to its plant at Bowling Green, Ky., to increase the daily capacity from 1500 to 2000 bbl. W. G. Williams, Williams Engineering Co., Oklahoma City, Okla., is head of the company.

The Memphis Leland Lock Co., Memphis, Tenn., has been organized to manufacture special automobile locks and similar equipment. Frank B. Folsom heads the company.

The coal tipple of the Edward J. Hackett Coal Co., Third and Water streets, Louisville, Ky., was destroyed by fire, Sept. 12, with loss estimated at about $10,000.

The Board of City Commissioners, Paducah, Ky., is planning for extensions and improvements in the municipal electric power plant to cost about $100,000.

Indianapolis

INDIANAPOLIS, Sept. 22.

L. S. Skelton, Okmulgee, Okla., has obtained 65 per cent of the capital stock of the Premier Motor Corporation, Indianapolis, manufacturer of automobiles, and becomes general manager. J. C. Flowers, Joliet, Ill., is president, and E. W. Steinhart, Indianapolis, vice-president. Practically all of the men who took over the plant in 1915 will retire. Mr. Skelton states that he will immediately enlarge the plant and increase the force to about 2000. The works cover seven acres of floor space and 40 acres of land.

The Logansport Utilities Co., Logansport, Ind., which has taken over the plant of the Logansport Heat & Power Co. from the receiver, will make improvemnts costing $25,000.

D. McCall White and E. C. Howard, Detroit, who recently resigned from the Cadillac Motor Car Co., have taken over the property of the Stenotype plant at Mars Hill, and will manufacture an automobile designed by Mr. White, who was vice-president of the Cadillac company, in charge of engineering. The new company has acquired 15 additional acres for future expansion.

The American Road Machinery Co., Fort Wayne, Ind., will move its plant to Delphos, Ohio.

Franklin J. Groth, Toledo, Ohio, will establish a plant at Indianapolis, for the manufacture of leaf springs for automobiles. The main building, 60 x 500 ft., will be at St. Paul Street and the Cincinnati division of the Big Four Railroad.

The Hoosier Wheel Co., Indianapolis, has increased its capital stock from $20,000 to $50,000.

The Guedel Mfg. Co., Portland, Ind., has been incorporated with $50,000 capital stock to manufacture automobile parts. The directors are W. M. Guedel, H. B. Guedel and M. G. Bimel.

The Electrical Equipment Co., South Bend, Ind., has increased its capital stock from $30,000 to $50,000.

The Wheeler-Schebler Carburetor Co. has acquired additional ground at Sanders Street and Barth Avenue, Indianapolis, where three factory buildings will be erected at a cost of about $100,000. The main building will be 108 x 132 ft. Two smaller structures will be used for testing motors.

The Shotwell Pump & Tank Co., Indianapolis, has changed its name to the Imperial Pump Co.

The Globe-Bosse-World Furniture Co., Evansville, Ind., will build an addition to its factory, to cost $150,000. Benjamin Bosse is president of the company.

The engine and boiler room of the Wizard Coal Mine, West Terre Haute, Ind., was destroyed by fire, Sept. 18. The mine belongs to the Hall-Zimmerman Coal Co., Terre Haute.

Fred W. Goedeke, manufacturer of stamped steel hardware and metal specialties, 411 Mary Street, Evansville, Ind., has purchased from the Ohio Valley Stone Co. five lots on the corner of Ohio and Goodsell streets, where he expects to build a stamping and machine shop next spring.

The Wayne Oil Tank & Pump Works, Fort Wayne, Ind., has let the contract for an addition, 135 x 375 ft., to cost $150,000 to be used as a tank shop.

The Cox Gate & Feeder Co., Winchester, Ind., has been incorporated with $10,000 capital stock to manufacture the Cox patent hog feeder and farm gate. Charles W. Cox is president.

Texas

AUSTIN, Sept. 20.

The St. Johns Oil & Refining Co., which has just established offices at 1415½ Main Street, Fort Worth, plans to build a refinery and develop oil production upon lands it has under lease in the central west Texas fields. The company has a capital stock of $7,000,000 and has been incorporated by Fred Pruitt, E. W. McKenzy and others of Fort Worth, and F. Noble, Denver, Col.

The Hog Creek Refining Co., Stephenville, has purchased a site for a refinery with a daily capacity of 4000 bbl.

The Lone Star Stone Co., Wichita Falls, has been incorporated with a capital stock of $100,000. A crushing plant will be installed and facilities for handling about 30 cars of material daily. J. A. Kemp is president and G. D. Anderson, secretary, treasurer and general manager.

The Rogers Refining Co., with offices in the Bedell Building, San Antonio, has purchased 35 acres adjacent to that city, upon which it plans to build an oil refinery. E. N. Canada is vice-president.

The American Refining Co., Fort Worth, recently incorporated with a capital of $10,000,000, is perfecting plans for the erection of its proposed refinery, which will have an initial daily capacity of about 60,000 bbl. of oil. The company has acquired oil properties in the Burkburnett fields. A. B. Reynolds is president.

The Southern Tractor & Supply Co., Dallas, has been incorporated with a capital of $30,000 to manufacture tractors and parts. Allen Bennett is the principal incorporator.

The Citizens Auto Co., San Antonio, has arranged for the erection of a three-story repair works and service building, 50 x 160 ft., to cost about $75,000.

The Chevrolet Motor Car Co., Fort Worth, has arranged for the erection of an addition to its local plant to cost about $500,000, including equipment.

The Associated Oil Co., Sharon Building, San Francisco, Cal., a subsidiary of the Southern Pacific Railroad, has acquired properties of the Rio Bravo Oil Co., in the vicinity of Eastland, Tex., and plans for the erection of a refinery, to include machine shops and other mechanical works buildings, as well as a general supply depot. Local headquarters have been established at Eastland.

California

LOS ANGELES, Sept. 16.

The Wilson & Willard Mfg. Co., Verona Avenue, Los Angeles, manufacturer of oil well tools and machinery, has had plans prepared for a one-story addition to its machine shop, 40 x 110 ft., and one-story forge shop addition, 50 x 75 ft. A 5-ton crane runway will be installed in the shops.

The Electro Alloys Co., Los Angeles, has been incorporated with a capital of $20,000 by Herbert L. McNair, G. G. Gray and John Gaenzle to manufacture metal products.

The Stephens Mfg. Co., Los Angeles, manufacturer of low pressure steam and water boilers, has removed to 1026 South Grand Avenue, for increased facilities.

Fire, Sept. 10, destroyed a portion of the shops of the Pacific Electric Railway Co., Los Angeles, at Seventh and Alameda streets, with loss estimated at about $100,000.

The Wilhite Machine & Auto Works, 1245 South Hope Street, Los Angeles, has been organized to manufacture machine parts and do general work, etc. Samuel C. Wilhite, 3926 South Grand Avenue, heads the company.

The Clinton M. DuBois Motors Corporation, Los Angeles, has been incorporated with a capital of $150,000 by Clinton M. DuBois, 4107 Van Ness Avenue; James A. Blair, 229

West Twenty-fourth Street, and D. J. Arnold, 817 West Fifty-sixth Street, to manufacture automobile equipment, motors and parts.

The Western Glass Products Co., 707 Hibernian Building, Los Angeles, has acquired property aggregating about 10 acres at Torrance, Cal., and plans for the erection of a new group plant, comprising several buildings, for the manufacture of glass cooking utensils, caskets and similar specialties. It has an operating capital of $1,000,000.

The Pacific Mfg. & Electric Co., 206 North Los Angeles Street, Los Angeles, has been organized to manufacture electrical products. J. N. Van Patten, 455 San Rafael Avenue, Pasadena, Cal., and J. M. Morris, 111 North Alexandria Avenue, Los Angeles, head the company.

The Eureka Boiler Works, San Francisco, has purchased the adjacent lot, 90 x 100 ft., and will erect an addition to its plant.

The Bunting Iron Works, Coalinga, has filed amended articles of incorporation together with a petition to increase its capital to $300,000. The main office is to be removed from Coalinga to San Francisco.

Canada

TORONTO, Sept. 22.

The Canadian Allis-Chalmers, Ltd., Toronto, is in the market for the following machines: One punch, 36 in. throat capacity, ⅞ in. dia. in ⅞ in. metal; one horizontal punch, ⅞ in. dia. in ⅞ in metal; one architectural jaw punch, 24 in. throat, ¾ in. dia. in ¾ in metal; one single or double angle shear, capacity 6 x 6 x ⅞, with or without rotary base (will consider 8 x 8 x ⅞ in. or 1 in. capacity); one radial drill, 60 in. or larger radius, capacity ⅞ in. dia. in ⅞ in. metal; all to be direct or belt driven. Where ¾ in. or ⅞ in. dia. in ¾ in. or ⅞ in. metal is specified, 1 in. will be considered.

W. H. Cooper, Clyde Building, Hamilton, Ont., has been awarded the general contract for the erection of an addition to the plant of the Dominion Sheet Metal Co., Ltd., 1322 Burlington Street, to cost $23,000.

It is announced that the Gregory Tire & Rubber Co. will establish its plant at Collingwood, B. C., near Kingsway. It will give employment to 50 men and have a daily capacity of 300 tires and 600 tubes.

A. Lafrance, 707 Lafontaine Street, Montreal, is preparing plans for the erection of a factory to cost about $50,000.

The B. J. Coglin Co., 2050 Ontario Street East, Montreal, will build an addition to cost $40,000. W. P. B. Coglin is president.

The Murrayville Toy Co., Murrayville, B. C., will erect an addition to cost $6,000. G. A. Gosling is manager.

The Ibex Tire & Rubber Co. of Canada, Ltd., Oshawa, Ont., recently incorporated, is having plans prepared for the erection of a factory. F. W. Bull, Simcoe Street North, is president.

W. H. Cooper, Clyde Building, Hamilton, Ont., has been awarded general contract for the erection of an addition to the plant of the Frost Steel & Wire Co., Sherman Street North, to cost $27,500. Gordon J. Hutton, Bank of Hamilton Building, is the architect. Sub-contracts will be let.

The Berlin Engine & Thresher Co., Kitchener, Ont., has changed its name to the Tuerk Engine & Tool Co., Ltd.

Contracts for the erection of five factories to cost $212,000 have been awarded by the Montreal Locomotive Works, Ltd., 145 St. James Street. The buildings are to be erected as an addition to the company's plant at Longue Point, Que.

The Percival Plow & Stove Co., Ltd., Merrickville, Ont., is negotiating with the Town Council for property on which to build a new molding shop and machine shop.

The Colonial Machinery Co., Ltd., Cowansville, Que., has been incorporated with a capital stock of $50,000 by Harry R. Fraser, Frederick S. Rugg, Charles de L. Mignault and others, all of Sherbrooke, Que., to manufacture machinery, tools, implements, etc.

The Canadian Auto Accessories Co., Ltd., Ottawa, Ont., has been incorporated with a capital stock of $40,000 by Frederick E. Heney, Thomas E. Powers, Frederick C. Wright and others to manufacture automobile parts, accessories, motors, etc.

The Union Cap Screw Co., Ltd., Walkerville, Ont., has been incorporated with a capital stock of $100,000 by James G. Bass, Windsor, Ont.; Olin M. Whitman, Alexander E. Whitman and others of Detroit, Mich., to manufacture screws, screw machines, tools, etc.

The Security Auto Theft Signal Co. of Canada, Ltd., Dunnville, Ont., has been incorporated with a capital stock of $100,000 by George H. Orme, William O. Smith, Adolphus W. Haun and others to manufacture iron, steel and brass, products, safety devices, etc.

The Glo Products, Ltd., Toronto, has been incorporated with a capital stock of $100,000 by Ira Marks, 351 Markham Street; Wilton Marks, 438 Lansdowne Avenue; James R. Curry and others to manufacture machinery, tools, implements, etc.

The Ibex Tire & Rubber Co. of Canada, Ltd., Toronto, has been incorporated with a capital stock of $50,000 by Edward W. Wright, Room 43, 44 King Street West; Christopher W. Thompson, 24 Crescent Road; Maxwell C. Purvis and others to manufacture automobile tires, accessories, etc.

The King Separator Works, Ltd., Bridgeburg, Ont., has been incorporated with a capital stock of $50,000 by Edward H. Neelon, George F. Peterson, Frank N. Rutherford and others, all of St. Catharines, Ont., to manufacture cream separators, implements, machinery, boilers, etc.

The Charles A. Strelinger Co. of Canada, Ltd., Windsor, Ont., has been incorporated with a capital stock of $100,000 by Charles A. Strelinger, Charles T. Bush, Charles E. Allinger and others, all of Detroit, Mich., to manufacture machinery, tools, automobile parts, etc.

The Buchanan-Duncan Motors, Ltd., Toronto, has been incorporated with a capital stock of $40,000 by John Jennings, 67 Yonge Street; James Buchanan, George H. Lovatt and others to manufacture motor cars, tools, engines, etc.

The Belt Grip Pulley Co. of Canada, Ltd., Toronto, has been incorporated with a capital stock of $200,000 by Daniel J. Coffey, 67 Yonge Street; Hugh J. Harkins, John J. Coffey and others to manufacture pulleys, castors, trucks and carriage wheels, etc.

The Pacific Northwest

SEATTLE, Sept. 16.

The car shortage is interfering seriously with shipments, and in some sections of the Puget Sound district has become so acute that lumber mills may be forced to temporarily suspend operations.

The Campbell Lumber Co., Seattle, plans the construction of a one-story power house, 46 x 50 ft., costing about $6000.

The Columbia City Furniture Co., Portland, has been incorporated with $75,000 capital stock by Benjamin Abrams, et al, to manufacture furniture.

A portion of the plant of the Pacific Coast Steel Co., Youngstown, Wash., was damaged to the extent of $5000 by a recent fire, originating in the 12-in. mill hot bed.

The Crown-Willamette Paper Co., Camas, Wash., is preparing to replace its wooden buildings with concrete structures and to install considerable new equipment.

A company in Chehalis, Wash., composed of Walter M. Wasser, J. A. Wasser, et al, has purchased the property of the Bunker Shingle Mill Co., and plans to install considerable new equipment to increase the present daily capacity of 250,000.

The plant of the Rex Metal Works, Seattle, was damaged in a recent fire, with a loss of about $6000, principally to the equipment.

Government Purchases

WASHINGTON, Sept. 22.

Bids will be received by the Bureau of Supplies and Accounts, Navy Department, Washington, until an early date for supplies for the naval service as follows: Schedule 4426, one motor-driven bolt threading machine; and 4427, one bar-iron rivet shearing machine, both for Brooklyn; 4497, one 30-in. cylinder boring machine, one 85-in. and one 12-in. cylinder boring machine, and one pipe threading machine; 4505, two turret lathes; 4506, for one 36-in. power arbor press; 4507, one 2-spindle centering machine, three motor-driven precision lathes and one 10-in. sensitive bench drill; 4508, miscellaneous motor driven radial drills, six, 22½-in., 28-in. and 18-in. motor-driven upright drill presses; two motor-driven double buffing machines; 4510, one universal grinding machine; 4519, six universal milling machines; 4520, one 36-in. gear-cutting machine and one 10-in. crank slotter; 4521, 21 motor-driven engine lathes, two extension gap lathes and one tool-makers' lathe; 4522, two vertical boring mills, two vertical turret lathes and two motor-driven planers; 4523, two 16-in. crank shapers and two 24-in. crank shapers; 4524, for two horizontal boring machines; 4528, one 30-in. sanding-disk machine, two pattern-makers' lathes, one double-spindle shaper; 4534, one 200-lb. steam hammer, one 37-in. slip-roll forming machine, one universal plate machine, one 200-ton forging press, one 30-in. single-end vertical punch, one motor-driven bending roll; one circular bench shear, one 37-in. power squaring shear and one 30-in. single vertical shear, all for Puget Sound.

OFFICE CHANGES

The Ajax Metal Co., Philadelphia, recently opened a branch office in Cleveland, located in the Schofield Building. L. E. Purnell is district manager. The Pittsburgh office has been discontinued.

The Standard Seamless Tube Co., Pittsburgh, has opened a New York office in room 1232 Tribune Building, 154 Nassau Street, that city, in charge of B. F. Bart as district sales manager.

The offices of S. Diescher & Sons, consulting engineers, have been removed from Farmers Bank Building to the fifth floor of the Conestoge Building, Ptiisburgh.

A branch office and warehouse has been opened in Chicago by the Williamsport Wire Rope Co., Williamsport, Pa. The office, which is in charge of C. M. Ballard, formerly Cleveland representative, is at 122 South Michigan Street, and the warehouse is at 755 Quincy Street.

The Sprake Sales Co., Inc., manufacturer's representative in the automobile and supply trade, 822 Higgins Building, Los Angeles, has opened branches in: San Francisco, 525 Market Street; Portland, Ore., 633 Railway Exchange Building; Salt Lake City, Utah, 233 Kerns Building. C. W. Ellsworth, formerly Pittsburgh Steel Co., Pittsburgh, is in the San Francisco office; G. L. Jubitz and F. H. Chown, formerly the Honeyman Hardware Co., Portland, have charge of the Portland office, and G. P. Wilcox of the main office San Francisco is in the Salt Lake branch.

The Carborundum Co., Niagara Falls, N. Y., has opened a branch office and warehouse in the Burkhardt Building, Second and Larned streets, Detroit, under the management of Anthony Dobson. A complete line of carborundum products will be carried to supply the Detroit district.

The Kelvin Engineering Co., Inc., engineer and contractor, 32 Broadway, New York, has organized a new department to do general engineering and contracting work in this country and in Latin America. This department will be in charge of Carlos Lobo, formerly borough engineer, Department of Water Supply, Gas and Electricity, Borough of Brooklyn, New York. The company will continue its existing business of designing and manufacturing sugar machinery and machinery for various industrial purposes and its export business in machinery of all kinds. In addition, the company is now prepared to execute contracts for furnishing and erecting sugar, electrical and industrial machinery and equipment and for the design and construction of water works. In conjunction with the Nazareth Foundry & Machine Co., Nazareth, Pa., it is equipped to manufacture a variety of castings and to do steel plate and machine work. Gustavo Lobo is president.

Under the title of "The Pittsburgh Foundryman," the Pittsburgh Foundrymen's Association has issued a pamphlet, being volume 1, No. 1, giving a complete list of papers read and discussions at the meetings of this association in January, February, March and April, this year. In the order named, these papers are as follows: "Converter Practice" by George P. Fisher, the Whiting Foundry Equipment Co.; "By-Product Coke Production," by H. B. Kirkpatrick, the Koppers Co., Pittsburgh; "Works Transportation," by J. E. Webster, director of buildings and equipment, Westinghouse Electric & Mfg. Co., East Pittsburgh, and "Clays in the Foundry," by Homer F. Staley, metallurgical ceramist, United States Bureau of Standards, Washington.

The American Society for Testing Materials is now located at the Engineers' Club of Philadelphia, 1315 Spruce Street. The decision to move the headquarters from the University of Pennsylvania was approved at the annual meeting at Atlantic City. The membership is now 2552.

NEW TRADE PUBLICATIONS

Mill and Factory Supplies, Steel and Metals.—J. M. Warren & Co., 245 River Street, Troy, N. Y. Catalog 10, 1353 pages, 8¾ x 11½ in., with stiff cover. Concerned with an extensive line of mill and factory supplies, auto and motor boat supplies, sporting goods, housefurnishing goods, bar iron, steel and metals. The catalog is profusely illustrated and is provided with an alphabetical thumb index.

Wire, Iron, Brass and Bronze Work.—Fred J. Meyers Mfg. Co., Hamilton, Ohio. Catalog 63. Illustrates and describes the company's line of machinery guards, window guards, enclosures, iron cranes, fire escapes, railings, signs, iron stairs, iron doors, iron fencing and gates.

Nickel and Its Products.—International Nickel Co., 43 Exchange Place, New York. Booklet. Concerned with nickel products which include nickel shot, ingots, electrolytic nickel, nickel oxide, nickel salts and fabricated forms.

Conveyors for Soot, Dust and Ash.—United Stokers Corporation, Old Colony Building, Chicago. Bulletin 101. Concerned with a steam jet conveyor for the removal of soot, dust and combustion ash.

Power Pumps.—F. E. Myers & Brother, Ashland, Ohio. Catalog PP-20, 142 pages, 6 x 9 in. Illustrates and describes power pumps, working heads, pumping jacks, hydropneumatic pumps, countershafts, power spray pumps, working barrels, well cylinders, etc.

Chilled Iron Car Wheels.—Association of Manufacturers of Chilled Car Wheels, 1229 McCormick Building, Chicago. Booklet by George W. Lyndon, president of the association, and F. K. Vial, consulting engineer. Describes the manufacture of chilled iron car wheels, their physical properties and methods of testing. Shellouts are discussed and methods for measuring the amount of tread wear are given. Numerous illustrations are included.

Universal Relieving Machine.—American Machine Tool Engineering Works, 485 West Kinzie Street, Chicago. Describes a high power universal relieving machine made in three sizes of 4 in., 8 in. and 12 in. capacities.

Lubricating Pumps.—Michigan Machine Co., Detroit. Describes Rollway pumps for all liquids, but particularly adapted to machine tools. The principal pumping mechanism consists of two rollers which rotate eccentrically in the pump chamber. This pump was described in THE IRON AGE issue of July 24, page 238.

Pressed Steel Building Sections.—National Pressed Steel Co., Massillon, Ohio. Catalog, 72 pages, 4 x 6½ in., with stiff cover. Illustrates and describes the construction and use of so-called steel lumber, made of pressed steel and designed primarily to take the place of wood joists and studs in floor and partition construction. The steel sections are provided with prongs punched from the flanges for the attachment of metal lath.

Thread Millers.—Smalley-General Co., Inc., Bay City, Mich. Folder. Specifications of the company's No. 1 and No. 2 thread millers.

Centrifugal Pumps.—Earle Gear & Machine Co., Wayne Junction, Philadelphia. Bulletins 71 and 72. The first deals with a single stage double-suction centrifugal pump and the latter with a multi-stage centrifugal pump. Illustrations and efficiency curves are included.

Hammer Crushers.—Pennsylvania Crusher Co., Stephen Girard Building, Philadelphia. Bulletin 1004. Deals with hammer crushers and breakers for use with bituminous coal. The machines are illustrated.

Baked Finishes.—Gehnrich Indirect Heat Oven Co., Inc., 60 Franklin Avenue, Brooklyn, N. Y. Catalog, 24 pages, 9 x 12 in. Devoted to baked finishes applicable to metal or wood products where the finish desired is to be in japan, enamel or lacquer. Numerous views are given of various products on which baked finishes have been used.

Industrial Transportation.—Bicycle Manufacturers' Association, Harftord, Conn. Booklet with the title "Industrial Transporation". It shows views of housing facilities for bicycles and motorcycles provided by various concerns.

T-squares and Drawing Boards.—Emmert Mfg. Co., Waynesboro, Pa. Catalog. Pictures and describes a drawing board and T-square designed to reduce time of operation and to permit the draughtsman to work while sitting or standing in a normal or healthy position.

Pulverized Coal for Locomotives.—Fuller Engineering Co., Allentown, Pa. Bulletin 21. Points out the advantages of pulverized coal for locomotives and illustrates and describes the company's equipment installed in different types of locomotives.

Current Metal Prices

On Small Lots, from Merchants' Stocks, New York City

The quotations given below are for small lots, as sold from stores in New York City by merchants carrying stocks.

As there are many consumers whose requirements are not sufficiently heavy to warrant their placing orders with manufacturers for shipment in carload lots from mills, these prices are given for their convenience.

On a number of articles the base price only is given, it being impossible to name every size.

The wholesale prices at which large lots are sold by manufacturers for direct shipment from mills are given in the market reports appearing in a preceding part of THE IRON AGE under the general headings of "Iron and Steel Markets" and "Metal Markets."

Iron and Soft Steel Bars and Shapes

	Per lb.
Bars:	
Refined iron, base price	3.37c.
Burden's H. B. & S. bar iron, base price	6.10c.
Burden's best bar iron, base price	6.30c.
Swedish bars, base price	20.00c.
Soft Steel:	
¾ to 1⅞ in., round and square	3.37c.
1 to 6 in. x ⅜ to 1 in	3.37c.
1 to 6 in. x ¼ to 5/16	3.47c.
Rods—⅝ and 11/16	3.42c.
Bands—1½ to 6 x 3/16 to No. 8	4.07c.
Shapes:	
Beams and channels—3 to 15 in.	3.47c.
Angles:	
3 in. x ¼ in. and larger	3.47c.
3 in. x 3/16 in. and ⅛ in.	3.72c.
1½ to 2½ in. x ⅛ in.	3.52c.
1½ x 2¾ in. x 3/16 in. and thicker	3.47c.
1 to 1¼ in. x 3/16 in.	3.52c.
1 to 1¼ in. x ⅛ in.	3.57c.
⅞ x ⅞ x ⅛ in.	3.62c.
¾ x ⅛ in.	3.67c.
⅝ x ⅛ in.	4.07c.
½ x 3/32 in.	5.17c.
Tees:	
1 x ⅛ in.	3.87c.
1¼ in. x 1¼ x 3/16 in.	3.77c.
1½ to 2½ x ¼ in.	3.57c.
1½ to 2½ x 3/16 in.	3.57c.
3 in. and larger	3.52c.

Merchant Steel

	Per lb.
Tire, 1½ x ½ in. and larger	3.37c.
Toe calk, ½ x ⅜ in. and larger	4.25c.
Open-hearth spring steel	6.00c.
Standard cast steel, base price	14.00c.
Extra cast steel	18.00 to 20.00c.
Special cast steel	23.00 to 25.00c.

Tank Plates—Steel

	Per lb.
¼ in. and heavier	3.67c. to 3.92c.

Sheets

Blue Annealed

	Per lb.
No. 8 and 3/16 in.	4.65c.
No. 10	4.70c.
No. 12	4.75c.
No. 14	4.80c.
No. 16	4.90c.

Box Annealed—Black

	Soft Steel C. R., One Pass, per lb.	Wood's Refined, per lb.
Nos. 18 to 20	5.55c. to 5.80c.	——
Nos. 22 and 24	5.60c. to 5.85c.	6.55c.
No. 26	5.65c. to 5.90c.	6.60c.
No. 28	5.75c. to 6.00c.	6.75c.
No. 30	6.50c. to 6.75c.	——

No. 28, 36 in. wide, 10c. higher.

Wood's Keystone Hammered, 18-24 gage, 9¾c.; 26-28 gage, 10¼c.

Galvanized

	Per lb.
No. 14	6.60c. to 6.85c.
No. 16	6.75c. to 7.00c.
Nos. 18 and 20	6.90c. to 7.15c.
Nos. 22 and 24	7.15c. to 7.30c.
No. 26	7.20c. to 7.45c.
No. 27	7.45c. to 7.70c.
No. 28	7.50c. to 7.75c.
No. 30	8.00c. to 8.25c.

No. 28, 36 in. wide, 20c. higher.

Corrugated Roofing, Galvanized

2½ in. corrugations, 10c. per 100 lb. over flat sheets.

Steel Wire

BASE PRICE* ON NO. 9 GAGE AND COARSER	Per lb.
Bright basic	5.25c.
Annealed soft	5.25c.
Galvanized annealed	6.00c.
Coppered basic	6.00c.
Tinned soft bessemer	7.25c.

*Regular extras for lighter gages.

Brass Sheet, Rod, Tube and Wire

BASE PRICE	
High Brass Sheet	29c. to 30.75c.
High Brass Wire	29c. to 30.75c.
Brass Rod	28c. to 29.75c.
Brass Tube	44½c.

Copper Sheets

Sheet copper, hot rolled, 16 oz., 33½c. to 36c. per lb. base.

Cold rolled, 14 oz. and heavier, 1c. per lb. advance over hot rolled.

Tin Plates

Bright Tin		Coke—14x20		
	Grade "AAA" Charcoal 14x20	Grade "A" Charcoal 14x20		Primes	Wasters
			80 lb. ..	$8.35	$8.10
			90 lb. ..	8.45	8.20
			100 lb. ..	8.55	8.30
IC	$11.30	$10.05	IC ..	8.80	8.55
IX	13.50	12.00	IX ..	10.00	9.75
IXX	15.25	13.75	IXX ..	10.95	10.70
IXXX	17.00	15.50	IXXX ..	11.90	11.65
IXXXX	18.75	17.25	IXXXX ..	12.85	12.60

Terne Plates

8-lb. Coating 14x20

100 lb.	$8.50
IC	8.65
IX	9.65
Fire door stock	11.75

Tin

Straits pig	58c. to 60c.
Bar	67c. to 72c.
American pig, 99 per cent.	57c. to 59c.

Copper

Lake Ingot	26c.
Electrolytic	24c. to 25c.
Casting	24c. to 25c.

Spelter and Sheet Zinc

Western spelter	8½c. to 9c.
Sheet zinc, No. 9 base, casks	12c.; open 12½c.

Lead and Solder*

American pig lead	6½c. to 7c.
Bar lead	7½c. to 8½c.
Solder ½ and ½ guaranteed	40c.
No. 1 solder	36c.
Refined solder	31c.

*Prices of solder indicated by private brand vary according to composition.

Babbitt Metal

Best grade, per lb.	90c.
Commercial grade, per lb.	50c.

Antimony

Asiatic	9c. to 10c.

Aluminum

No. 1 aluminum (guaranteed over 99 per cent pure), in ingots for remelting, per lb. 35c. to 37c.

Old Metals

The market is quiet. Dealers' buying prices are nominally as follows:

	Cents Per lb.
Copper, heavy and crucible	17.00
Copper, heavy and wire	16.00
Copper, light and bottoms	14.00
Brass, heavy	10.50
Brass, light	7.50
Heavy machine composition	15.50
No. 1 yellow rod brass turnings	10.00
No. 1 red brass or composition turnings	11.50
Lead, heavy	5.00
Lead, tea	3.75
Zinc	4.75